November 1983
Vol. 9, No. 11
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Emphasis On Languages

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- Osborne Executive
- Olympus C-100 Tape Recorder
- Simon's Basic For Commodore
- Lisp For Atari
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- Incredible Jack
- Think Tank
- Instant Recall
- Electric Webster
- Learning Games
- Zork III
- Games for Apple
  Commodore 64
  VIC 20
  Panasonic JR-200

Ken Uston: Home Computers And Wall Street

The Graphics Event Of The Year: Siggraph '83

CBasic Tutorial

Assembly Language Tutorial

Geosynchronous Satellite Locator

IN-DEPTH EVALUATIONS:
- NEC PC-8800
- Toshiba T100

WHILE OTHER COMPUTER COMPANIES ARE BUSY SETTING NEW PRICES,

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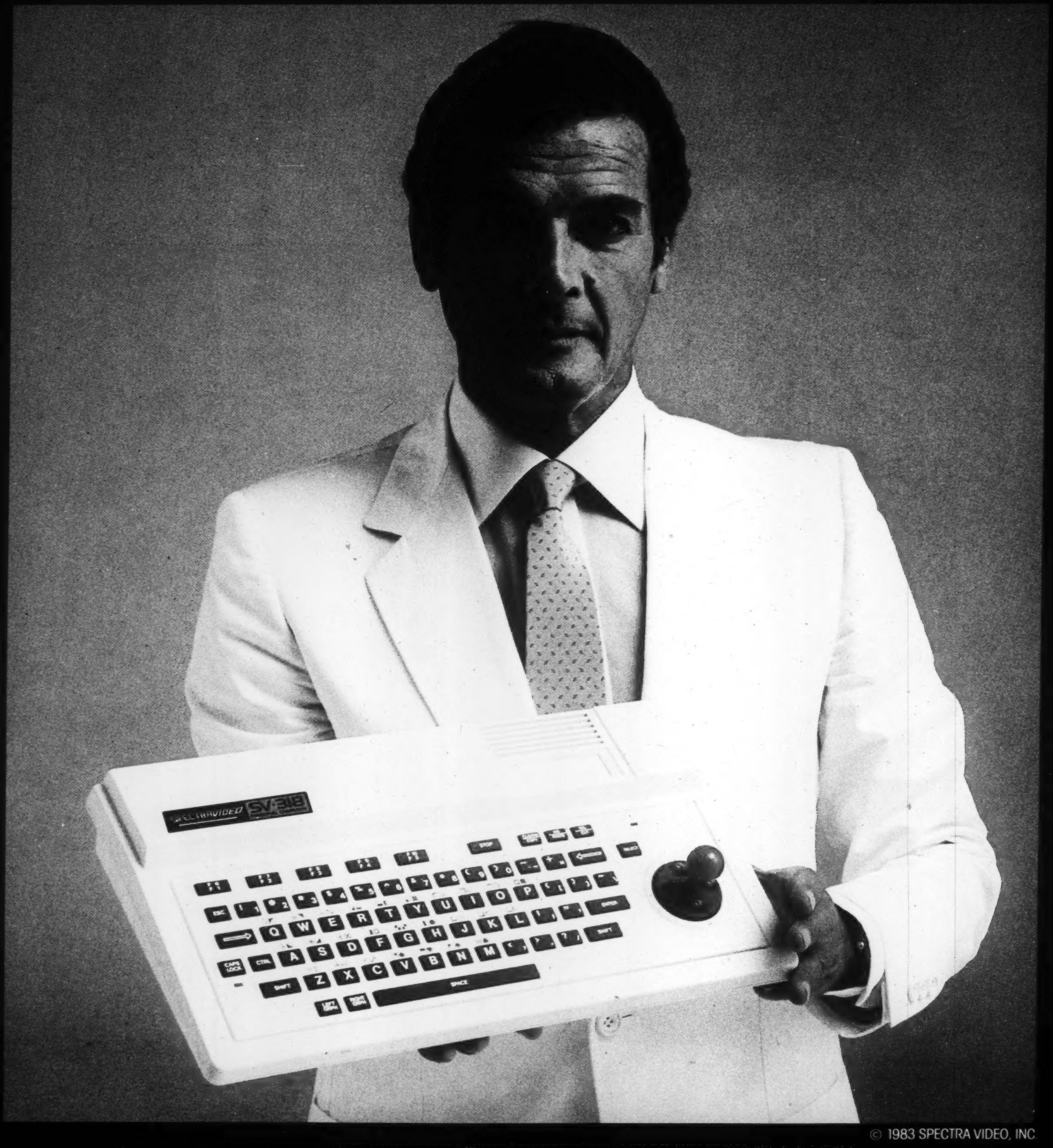
SPECTRAVIDEO
SV-318

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MSX™ and LOGO™: Two Spectravideo is in Personal

While price wars and confusion reign all around us, Spectravideo goes about its business, setting standards by which all other personal computers will soon be judged. MSX and LOGO are the two latest examples of how Spectravideo is rocking–and reshaping–the personal computer industry.

MSX AND LOGO.

It is now history that, on June 15 1983, Spectravideo, Inc. joined with most of Japan's largest electronics firms to launch MSX: The most far-reaching personal computer standard in history. MSX is the name given to a specific hardware/software configuration that makes product interchangeability possible. While Spectravideo is proud to participate in MSX, we are even prouder of this fact: It was our own SV-318 computer that was used as a prototype for the MSX design! There are two important aspects to this.

First, all future MSX hardware–i.e. computers, peripherals, appliances–will be based on several key design elements of the SV-318. What does this mean to you, the consumer? A great deal, because when you buy an SV-318, you will not only be able to use all of Spectravideo's own software and hardware–you'll also be able to take advantage of all the remarkable new equipment that will be coming from other MSX participants.

In addition, the software aspect of MSX was largely inspired by the software built into the SV-318. From the outset, Spectravideo offered built-in Microsoft BASIC as its resident interpreter. Now, Microsoft

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also makes a LOGO program compatible with the SV-318. It was Spectravideo's Microsoft BASIC/LOGO that helped to make MSX possible.

Another standard that Spectravideo can take credit for is the built-in Joystick/Cursor Control. Built right into the SV console, this control is always at fingertips and is much easier and faster to use than external joysticks or conventional editing controls. Certain engineering elements that helped to make this built-in control possible have also been incorporated into MSX.

OTHER STANDARDS OF EXCELLENCE.

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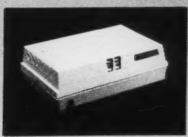
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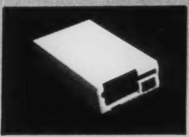
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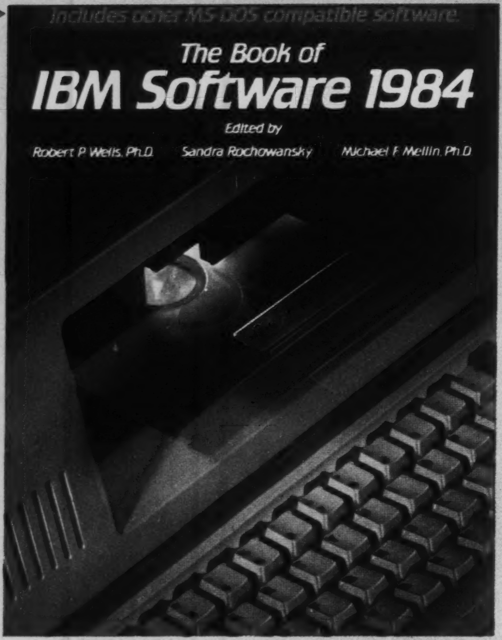

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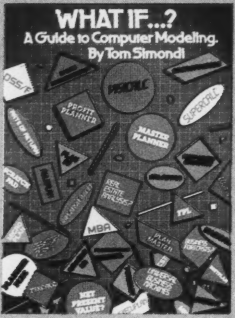

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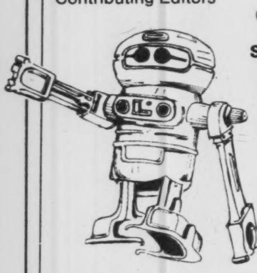

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Faced with a fall and winter of virtually no sales, many thousands of dollars of unneeded parts and excess production staff, I had no choice but to shut down the production lines. And if a solution to our problem couldn't be found, the business itself was in jeopardy.

A life saving decision

I spent many sleepless nights trying to come up with a solution to this nightmarish situation. Then I remembered a course I had taken in decision analysis. I spent the rest of that night reviewing course material and other books I had bought on the subject. The next day, I called an emergency meeting.

Using the decision making techniques I had learned, we spent the rest of the week searching for and analysing potential solutions. The net result was that not only was the company pulled back from the brink of destruction, but we added over $1,000,000.00 in gross sales during that off-season.

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Input/Output

Summing It Up

Dear Editor:

Many programming texts challenge programmers to write a program for the Fibonacci sequence 1 1 2 3 5 8 13 21 ... in which each number in the sequence is the sum of the two immediately preceding numbers. I have come across this exercise several times, but have never seen in print an actual program to accomplish this task.

For interested readers I submit the program in Listing 1.

The upper limit of Y can be the limit of the range of your computer. I would appreciate hearing from readers about other approaches.

Konrad H. Kossmann
39 Chatham Rd.
Columbus, OH 43214

Your program is overkill for a simple problem. The program can be written in three lines (see Listing 2). A somewhat more elegant approach is shown in Listing 3. —DHA

Listing 1.

```
10 FOR Y=1 TO 1000:Z=X+Y
20 PRINT Y;
30 T=Y:Y=Z:Z=X:X=T
40 T=Z:Z=Y:Y=T
50 T=Z:Z=X:X=T
60 NEXT
```

Listing 2.

```
10 X=1:Y=1:PRINT 1;1;
20 Z=X+Y:PRINT Z;
30 X=Y:Y=Z:GOTO 20
```

Listing 3.

```
10 DIM N(30):PRINT 1;1;
20 N(1)=1:N(2)=1
30 FOR I=3 TO 30
40 N(I)=N(I-1)+N(I-2)
50 PRINT N(I);
60 NEXT
```

Price Fix

Dear Editor:

The New Product listing you ran on our DTC 380Z in your July 1983 issue (p. 230) quoted an incorrect price ($1199).

We have added a number of new features and capabilities to the machine and the suggested list price of the 380Z has been set at $1359.

Roy M. Worthington
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How About Meese?

Dear Editor:

Re: Your comments concerning *mouses* vs. *mice*, "dateline: tomorrow" column, *Creative Computing*, July, 1983.

During much of the nineteenth century railroads were *the* growth industry that data processing is today. Some time before 1840 an unknown railroad freight train conductor decided that he could better inspect his train from the roof of the last box car. Being industrious, probably as a result of a less than well padded bottom, he installed a chair on that final car and called the invention a *caboose*.

A serious problem arose when a second conductor similarly modified a box car. What are two of these things called? Some railroads call them *cabooses*, others *cabeese*, still others *caboose* (singular and plural being the same). Webster, at least in my version, is silent. Only the singular is shown.

The then "Standard Railroad of the World," the Pennsylvania, solved the problem neatly by referring to their rear end conductor's office as a "cabin car." Now, that's a phrase you can't mess up. Unfortunately, other railroads didn't get the message and the problem of more than one caboose exists today. But it won't tomorrow—the Federal Railroad Administration has decreed that railroads can, through complicated negotiations, rid themselves of that little red (or blue, or orange, or yellow, or green, or whatever) thing at the end of the train and move the conductor to the engine(s). No problem with plural there.

So what's the message? History tends to repeat itself. The new growth industry, computers, seems to have a mouse by the tail. Let's hope it does not take some future FCC, FTC or XYZ to decide the issue. Let's hope some "Standard Computer Company of the World" comes forth with a better name, that all will accept.

Carl D. Bossard
Superintendent Hazardous Materials
Illinois Central Gulf Railroad Company
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- Telephone support — autodial/autoanswer modem
- Voice recognition of commands and voice response
- Voice mail and messages
- Dictating system using Pearlcorder X-02 or XR from any telephone in the U.S.
- Complete software for written/voice mail, time management and audio/visual clock, calendar, and calculator functions
- Three ELAN Systems; the Secretary, the Manager and the Executive

The Manager

The Executive

The MANAGER system adds a modem for telephone data communications and by adding a separate handset, will permit voice communications. The modem enables the MANAGER to receive unattended voice and data from any telephone in the U.S. Also, the MANAGER can accept commands through decoding the tones from the telephone keypad.

The EXECUTIVE is the most complete implementation of ELAN, adding computer recognition of spoken commands. An executive might phone the PC to leave or retrieve messages or request specific information. The PC, in a spoken voice, can request a user's access code or prompt the user for a command. The executive can respond either by pushing buttons on the telephone, or by actually speaking back to the computer.

The SECRETARY is the basic ELAN system. It includes an Ethernet interface and all other ELAN features except modem and voice recognition.

Whether you choose the EXECUTIVE, MANAGER or SECRETARY, an ELAN system will improve your productivity and expand the versatility of your IBM PC.

The Secretary

ELAN is designed to meet your total communications needs, including computer-to-computer (i.e., networking), person-to-computer, and person-to-person communication requirements for data and voice. The industry-standard high speed Ethernet network protocol is employed in ELAN, permitting many IBM Personal Computers to be linked together by ordinary thin coaxial cable. In addition to his own computer, an ELAN system user can access the other devices attached to the cable — such as printers and large disks.

All versions of ELAN include an Ethernet interface with equipment to convert voice into data and back again. This enables the user to give and receive spoken messages from any location as well as store them for later use. In addition, with the Executive version, all ELAN software packages can be operated through verbal commands, through the telephone keypad or through the IBM PC keyboard. The computer can then respond verbally, either by telephone or 'in person'.

*ELAN (Extended Local Area Network) formerly ComNet

TECMAR 6225 Cochran Road, Cleveland, Ohio 44139, Phone (216) 349-0600, Telex 466692

CIRCLE 253 ON READER SERVICE CARD

Street Price Index

The Creative Computing Street Price Index is an on-going monitor of the average price levels of selected computers, peripherals, video games and related accessories in the real-world marketplace. The list price is the price set by the manufacturer for the product when it was first announced, and is not necessarily the current manufacturer list price.

As time goes on, this Index will be presented in graphical form, but until there are six or seven data points, a graph would be of little value.

This Index is not intended to be a purchasing guide. Frequently, the lowest price for a computer will be offered by a vendor who is going out of business or closing out that particular item. Unless you are convinced you will never need service or are skillful enough to repair an unhealthy computer yourself, you would probably not want to buy a machine from such an outlet.

Furthermore, most of our price monitoring is done in major metropolitan areas on the two coasts. Prices outside of large cities and in the central part of the country are usually higher.

	Orig List Price	Sept 1983 ....Monthly....... High	Low	Average	Month Ago	Year Ago
Computer						
Apple IIe (64K, 40-col)	1395	1395	1149	1260	1285	n/a
Atari 400, 16K	559	259	69(1)	164	164	352
Atari 800, 48K	999	549	289(1)	412	437	863
Atari 1200, 64K	899	679	349(1)	514	544	n/a
Commodore Vic-20	297	149	69	109	114	274
Commodore 64	599	399	189(1)	294	299	n/a
Osborne 1, 64K	1795	1795	1075	1440	1492	1895
Radio Shack:						
Color Comp, 16K	399	199	199	199	249	399
Model 4, 64K	999	999	999	999	n/a	n/a
TI 99/4A, 16K	635	269	84(1)	167	169	299
Timex 1000, 2K	99	65	29	43	43	149
Average home computer (up to 16K)	398	208	91	145	151	295
Line Printer						
Epson FX-80	699	695	535	615	630	n/a
Epson MX-80FT	745	505	395	450	450	567
NEC PC-8023A	795	499	399	449	449	599
Okidata 82A	799	459	380	420	420	549
Okidata 92	699	599	489	544	544	n/a
Star Gemini 10	449	399	295	357	359	n/a
Average 80-col dot matrix printer	697	526	415	470	473	572
Video Games						
Atari 2600	199	99	69(1)	84	84	149
Atari 5200	269	200	155	178	178	n/a
Colecovision	199	189	135	162	162	n/a
Intellivision II	199	150	79(1)	115	115	189
Average video game	216	145	109	127	127	169
Dynamic Memory Chips (200 ns, quantity 8)					...Lowest..	
16K x 1 bit (4116)	...	1.95	1.50	1.73	1.50	1.56
64K x 1 bit (4164)	...	7.49	5.95	6.72	...	n/a

(1) Includes a manufacturer rebate or equivalent

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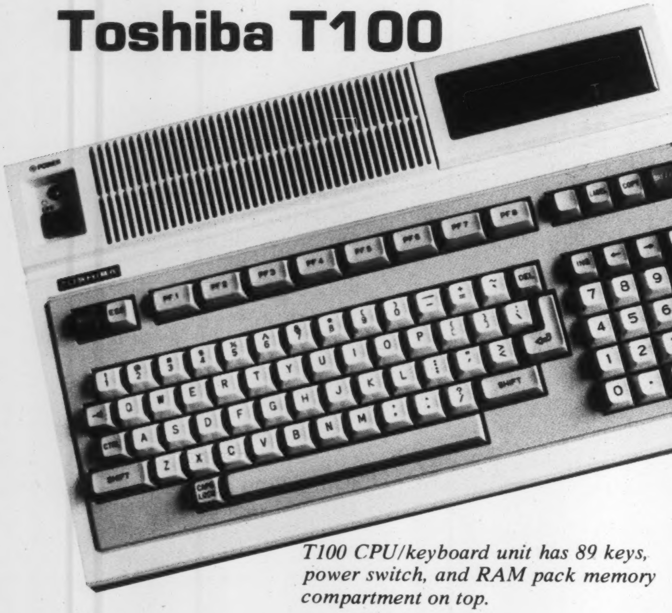
creative
computing
equipment
evaluation

Toshiba T100

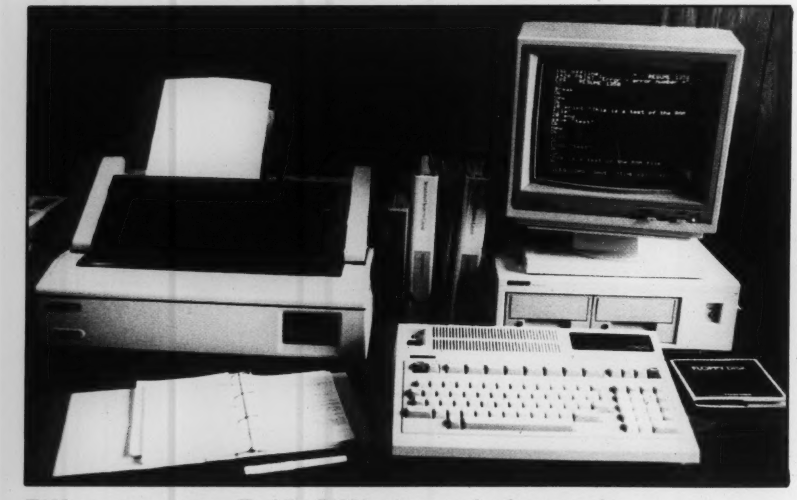


T100 CPU/keyboard unit has 89 keys, power switch, and RAM pack memory compartment on top.

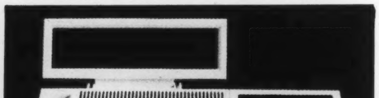
David H. Ahl

The Toshiba T100 is a small business computer that boasts an element of portability for the executive on the move. In its normal desktop configuration, the T100 consists of a CPU/keyboard unit, disk drive unit, and monitor. For travelling, the CPU/keyboard unit tucks into a hardside attache case along with a 40-character by 8-line LCD display, and optional Lexicon direct/acoustic modem.

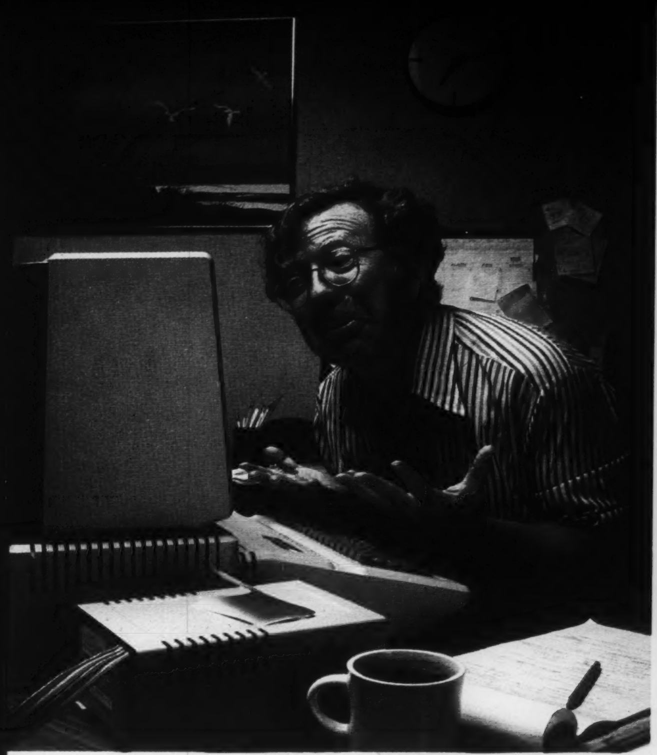
This type of portability is a cross between the total portability of the TRS-80 Model 100 and the carry-around portability of the Osborne. The T100 in its carrying case with LCD display and coupler weighs in at a hefty 21 pounds. By way of comparison, a Model 100 weighs around one pound, and an Osborne around 28. Unlike the Model 100, the T100 is not battery powered, but it does have memory cartridges which have their own self-contained batteries. When it is being carted about, these memory cartridges take the place of disk drives, although the capacity is considerably less.

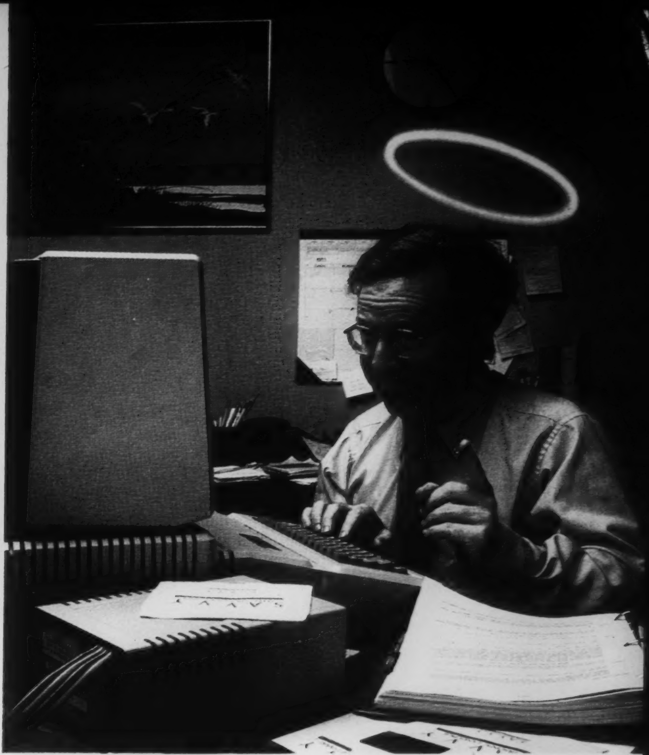


T100 computer system, Toshiba P1350 printer, and software packages.



LCD display (8 lines x 40 characters) attaches to the back of the CPU/keyboard unit.





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CPU/Keyboard Unit

The T100 is based on an 8-bit Z80A running at 4 MHz. In our benchmark test (in Basic), the T100 was the fastest of the twenty 8-bit machines we have tested to date. It ran the benchmark program in 1:09 minutes compared to most other Z80 computers which took around 2 minutes.

The T100 is equipped with 64K of RAM, 16K of video memory, and 32K of ROM. In addition, 16K and 32K RAM and ROM packs can be plugged into two slots on the upper right corner of the unit. These ROM and RAM packs are not in addition to main memory; rather, they are like disk drives. ROM packs contain certain application programs, and RAM packs can be used to store user programs.

RAM PACK 16 PA7242U TOSHIBA

ROM and RAM plug into two slots at the top right of the CPU/keyboard unit.

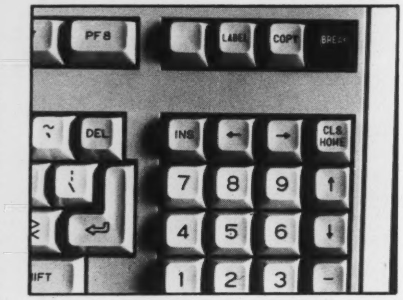
The CPU/keyboard unit measures 16.5″ × 11″ and slants from a height of 4″ at the rear to 1.5″ in front. The keyboard has 89 keys divided into a standard keyboard, numeric keypad, and top row of function keys.

The layout of the keyboard is refreshingly standard—both shift keys are where they ought to be, and "extra" symbol keys are to the right of the alphabetic keys.

Three keys that seem to wander around on the keyboards of different manufacturers are the caret (up arrow), apostrophe, and ampersand. On the T100, we find the caret as a shifted 6, the ampersand as a shifted 7, and apostrophe with the quote key to the right of the middle row.

The numeric keypad, surprisingly, does not have the four arithmetic operations adjacent. Instead we find four cursor movement keys and a CLS/HOME key.

The top row of keys includes a green GRAPH key; holding this down while pressing another key on the keyboard produces a graphics symbol. For example, GRAPH plus 2 produces a heart symbol on the display. We would rather have had the GRAPH key toggle graphics mode on and off; instead it must be pressed for each graphics character.



Cursor control keys are adjacent to the numeric keypad.

Also in the top row are BREAK, ESC, COPY (causes current screen display to be copied to the printer), and LABEL (displays the meanings of the function keys on the 25th line of the display). In graphics mode, the copy function is designed to work with the Toshiba 1010 printer. On other printers, even the top-of-the-line Toshiba 1350, it produces gibberish.

Eight programmable function keys cause particular functions to be executed without pressing RETURN. These keys are assigned different functions in different software packages, or may be user-defined in Basic.

The computer normally operates in overstrike mode, i.e., typing over a character replaces it with a new one. The INSERT key opens up a space to type in an additional character. Unlike some other computers, the T100 does not stay in insert mode; the key must be pressed for each character inserted.

The DELETE key operates in a somewhat unconventional manner. Instead of deleting the character over the cursor, the character to the left of the cursor is deleted. This is very strange, and not at all what one would naturally expect.

creative computing

HARDWARE PROFILE

Product: Toshiba T100 Computer System

Type: Portable small business system

CPU: 8-bit Z80A, 4 MHz

RAM: 64K (optional 16K and 32K RAM packs)

ROM: 32K

Keyboard: 89 full-stroke keys

Text resolution: 80 chars x 25 lines

Graphics resolution: Four modes, up to 640 x 200 pixels

Number of colors: 8

Sound capability: 1 channel, 5 octaves

Ports: RS-232 serial, Centronics parallel printer, cassette

Dimensions: 16.5" x 11" x 4"

Documentation: User's Guide, Programmer's Reference Manual, One manual with each applications software package.

Summary: Outstanding graphics, excellent version of Microsoft Basic, nice choice of applications software. Portable with addition of battery RAM pack, LCD display, and case. Comes with CP/M 2.2, Basic and nine applications packages.

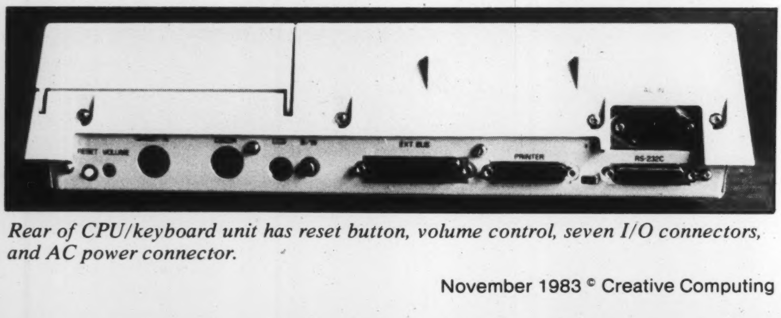
Price: CPU, dual disk drives, monochrome display, software $1995.

Manufacturer:
Toshiba America, Inc.
Informations Systems Division
2441 Michelle Dr.
Tustin, CA 92680

However, for normal typing of text and programs, the keyboard has an excellent tactile feel; there is absolutely no keybounce; and it is very pleasant to use. All keys repeat when held down for more than one second; individual keystrokes are silent, but automatic repeats are accompanied by a click sound in the built-in speaker.

Another delightful feature is that the power switch is on the left top of the unit along with a green LED which indicates if it is on—no more reaching around the back to search for an elusive rocker switch.

On the rear of the unit are eight connectors and two controls. A reset pushbutton is on the lower right; this is rarely needed except when loading a new



Rear of CPU/keyboard unit has reset button, volume control, seven I/O connectors, and AC power connector.

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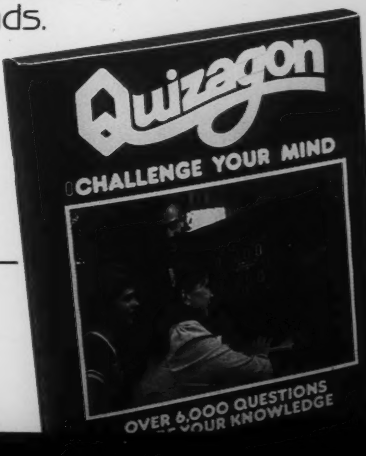
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disk operating system. A recessed volume control adjusts the volume of the internal speaker.

Two identical 7-pin DIN sockets provide I/O to a cassette recorder and RGB color monitor. This seems to be the emerging standard for non-IBM compatible machines, which is too bad. We have already seen two people try to plug cassette cables into a monitor. Fortunately, the T100 monitor cable terminates in a unique rectangular 8-pin connector at the monitor end, but this is not the case on all machines.

The cassette interface operates at 1600 bps, a moderately high speed. However, we can't imagine using a cassette for storage on a business-oriented computer in this price range, so we did not test this capability.

A small 8-pin connector connects to the LCD display, and an RCA phono jack connects to a B/W monitor. No RF output is provided, so the machine cannot be used with a standard TV set.

The T100 has two RS-232 connectors: a male for a Centronics parallel printer, and a female for a modem, plotter or other RS-232 serial device.

A D50 female connector is provided to connect the disk drives to the CPU/keyboard unit.

High-Resolution Display

Two displays are available for the T100, a monochrome green screen unit and an RGB color display. Much of the software is designed to take advantage of a color display, so it is this one which we tested with the computer.

The RGB display has only two user-accessible controls: vertical hold on the rear (adjust it once and forget it) and brightness on the front. A pushbutton power switch turns the unit on; a green LED indicates when it is on—a nice touch.

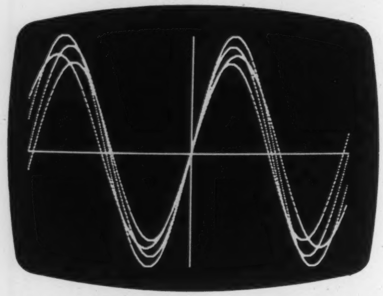
Eight well-defined colors can be displayed simultaneously in any of the three display modes: text, low-resolution graphics, and high-resolution graphics.

In text (or character) mode, the display can be set to either 80 characters by 25 lines or 36 characters by 24 lines. Both modes use an 8 × 8 dot representation for characters. The bottom-most dot is used for interline spacing as well as for lowercase descenders; this leads to less legibility than one might desire.

In low-resolution graphics mode, two resolutions are also available: 160 × 100 pixels or 72 × 96 pixels. In high-resolution graphics mode, pixel resolution is either an astonishing 640 × 200 or 288 × 192.

Unfortunately, the manual is not clear on how to obtain the two different resolutions within each graphics mode.

High resolution screen displays 600 x 240 pixels in eight colors.



Simple plotting program produces high resolution output.

We found by trial and error that in Basic the WIDTH command would do it, while in CP/M, specifying MONITOR selected the higher resolution and TV selected the lower one.

To produce color graphics, it is somewhat easier to use the low-resolution mode as color can be directly specified in commands such as LINE, PSET, and CIRCLE. In high-resolution mode, color must be specified with the COLOR command which is somewhat more cumbersome to use.

The PA7161U RGB monitor is mounted on a base which permits it to swivel 45 degrees to the right or left and tilt from 5 degrees forward to about 20 degrees back. This makes it easy to adjust for nearly any mounting position or room condition. While a tabletop position is recommended, we put ours on top of the disk unit for a significant saving of desk space.

Disk Drives

The T100 comes with a floppy disk drive unit measuring a sizeable 16.5" × 10.5" × 5". It contains two 5¼" double density, double sided drives capable of storing 280K per disk (formatted). Thus, the dual drives provide about 560K of on-line storage capacity.

The power switch for the disk drives is on the right side at the rear, although a green LED on the front indicates the drives have power, as does the whine of the muffin fan in the unit.

A red LED on each drive indicates when input or output is taking place, but is not always lit when the drive is spinning. Thus, it is probably wise to wait a few seconds after the LED goes out before removing a disk from the drive.

Portability Kit

For portable operation, the T100 requires a hardside attache case, LCD display (8 lines by 40 characters), and one or more RAM packs. Optionally available is a Lexicon LEX-12 modem. The T100 CPU, display, RAM packs, and modem all fit into the case.

In operation, the T100 and modem require 110 volts, so "portable" really means "carry around" and not "operates anywhere."

The LCD display is the same as that found on the TRS-80 Model 100. This one, however, clamps to the rear of the T100 and the entire unit tilts back and forth for legibility under different lighting conditions. This is not as convenient as the adjustment on the Model 100, but it is satisfactory.

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Toshiba T-100, continued...

When the computer is powered up, it automatically "knows" which display is connected and uses it. The monitor and LCD display cannot be used simultaneously; if both are connected, gibberish appears on both screens.

The 300-baud modem is supplied by Lexicon Corp., and can be used directly connected to a modular telephone jack or as an acoustic coupler. The modem requires an external low voltage power supply (included).

RAM packs are available in either 16K or 32K capacities. Two cartridges can plug in simultaneously. In operation, these RAM packs are considered to be disk drive 5 and standard disk commands are used to save and retrieve data and programs.

We had a preliminary T100 Portability Software Kit which consisted of four programs: Memopad (a memo writer similar to the Model 100 Text program), Smalterm (for remote communications), Expense/Accounter (for reporting expense account data), and LCD/LCD3D (demonstration programs for the LCD display).

System Software

The basic T100 CPU has T-Basic resident in ROM. A disk-based system comes with two systems disks, one containing T-Disk Basic and the other with CP/M 2.2 and CBasic 2. Both disks also contain six or seven utility programs.

The resident T-Basic is actually Microsoft Basic and we have no idea why the manual does not refer to it as such. When the T100 is powered up, it goes through a six-second self-check followed by a screen query, "How many files (0 to 15)?" Upon answering, the screen displays:

```
Toshiba T-Basic
(c) 1982 by Microsoft
29066 Bytes free
```

Why are only 29,066 bytes free in a 64K machine with Basic in ROM?

Why are only 29,066 bytes free in a 64K machine with Basic in ROM? Apparently, this is due to the addressing limitations of Microsoft Basic which can use only 32K of user memory, no matter how much is available in the computer.

Disk Basic has even less free memory, 24,820 bytes. These figures are for no files; if files are specified, each file buffer takes up an additional 200-plus bytes of user memory space.

T100 Product Manager Dr. Sorel Reisman tells us that the full RAM space is available under CP/M, but we had no easy way to determine exactly how much there was.

CP/M comes with the base core of CP/M utility packages for disk operations (format, copy, reconfigure), file operations (name, rename, copy, examine, delete), DDT (dynamic debugging technique), CBasic (and CRUN), and several demo programs. CBasic is a compiler Basic written by Gordon Eubanks, who recently merged his company, Compiler Systems, with Digital Research. In any event, CBasic is very fast compared to an interpreted Basic such as Microsoft Basic.

Toshiba does not furnish any documentation on CBasic and gives no hint that CBasic programs must be written using a word processing package such as *Word Right* and executed using CRUN2 (included on the CP/M disk). Nevertheless, it is a nice extra for the serious programmer.

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Toshiba T-100, continued...

The documentation for CP/M itself is rather sparse, but we were told by Toshiba that this is deliberate. Rather than overwhelming the customer with something he may not need or want, Toshiba felt that CP/M users would either (1) be experienced and know what they were doing or (2) need so much tutorial information that it would substantially add to the cost and bulk of the system.

Microsoft Basic

The T100 version of Microsoft Basic is exceptionally powerful with a rich set of commands, statements, and functions. It has extensive string and file handling capabilities, and good tutorial manuals that describe how to get the most of it and are available from many independent publishers.

T100 Basic has all of the expected operations, single- and double-precision variables, two-dimensional arrays, six Boolean operators, string operations, and the ability to call assembly language subroutines.

The T100 implementation supports multiple program calls using CHAIN, COMMON, and MERGE. Moreover, files can be on either disk or RAM pack.

Both sequential and random files can be used. Although, it is more complicated to create and access random files than sequential files, there are many advantages to using them. In particular, with random files, data can be located anywhere on a disk or RAM pack; it is not necessary to read through all the information to access a single record.

Full on-screen editing is supported with both the monitor and LCD display. This means that the cursor can be moved about a program listing on the screen, a change made, and RETURN pressed to enter the change.

The T100 has a real-time clock which is set and accessed with the TIME$ function. We would have expected that if a battery-powered RAM pack were installed, it would be used to store permanently the time of day. This is not the case, and TIME$ must be entered each time the machine is powered up.

T100 Basic includes extensive graphics and sound capabilities. Commands such as PSET (turns on a single pixel), PRESET, LOCATE, LINE (draws a line between two points), PAINT, CIRCLE, and COLOR are supported in all of the graphics modes. We found it just as easy to draw plots on the LCD screen as on the monitor. The only difference in using the two graphics modes is that the high resolution mode does not allow a color attribute to be appended to the LINE, PSET, or CIRCLE statements, nor is it as easy to display the eight colors simultaneously.

In addition to the graphics statements mentioned above, the T100 also has a graphics macro language (GML) within Basic. GML has 14 commands such as U (draw up), L (draw left), and H (draw diagonally down right). In addition it has A (rotate coordinate axis 90 degrees), C (color), S (scale factor), and a powerful string command which allows nesting of drawing actions. In general, GML is very similar to the turtle graphics commands in Logo.

Sound may be produced in two ways. The easiest is by the use of the SOUND (p,d) command which causes notes of pitch p to be played for duration d. The range is five octaves.

A more powerful sound capability is the music macro language. This has seven commands to specify pitch, duration, note or rest, octave, pause, and tempo. As with GML, a string command allows nesting of sound sequences.

In summary, Microsoft Basic as implemented on the T100 is one of the best we have seen and, except for the memory usage limitation, gives the user access to the full capability of the hardware.

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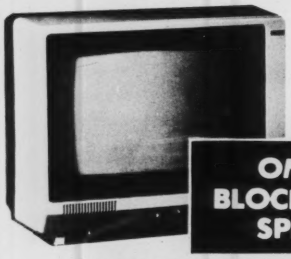

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Wargames

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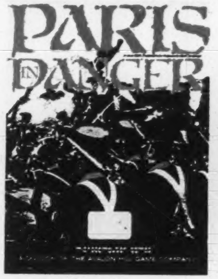
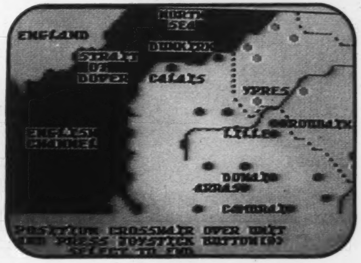
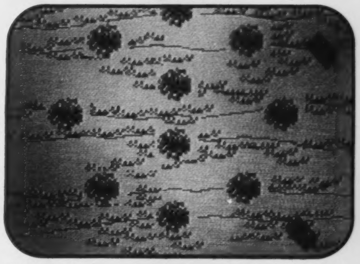


Strategic Level



Tactical Level



TAC
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For all Atari Home Computers, 48K Disk: $35.00

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SCORE: -6
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CIRCLE 106 ON READER SERVICE CARD

Word Processing

The standard word processing package furnished with the T100 is *Word Right* by Structured Systems Group. This package runs under CP/M, v. 2.2. Although page 1.2 of the manual indicates that it is distributed on two 5¼" double density disks, we received only one disk. Missing also from our package were the key labels without which it is nearly impossible to use the system.

Word Right requires a computer with a minimum of 56K, two disk drives, 24 row by 80 column display, and a printer with a print width of at least 85 columns.

The manual is prepared by SSG and is very comprehensive and thorough. However, the manual is written for a "typical" CP/M system and is not customized at all for the T100.

The manual includes installation instructions, a section on getting started which explains the various screen movement keys, a 30-page tutorial section, a 100-page reference section, and several shorter sections about using the system with files generated on other software packages. All of the sections have illustrations of the keyboard, screen, or both as appropriate—a welcome touch.

A review of *Word Right* could be a feature review in itself. Let us just say that it is a capable word processing package with all the features that one might expect. It is largely menu-driven with Help screens available at any time during creation of a document. Phrases and text from one location or file can be easily used in another, and functions such as Erase, Insert, Cut, Copy, and Paste all work with a single character, word, line, phrase, paragraph, or page.

Depending upon the printer being used, *Word Right* can produce boldface, underline, proportional justification, super- and subscripts, and soft hyphenation.

Word Right works with the SSG *Name and Address* (NAD) system, which is also included with the T100. The *NAD* package is for the creation of mailing lists. Each name may have up to eight reference variables for sorting or printing. In addition, names may be called by *Word Right* for producing "personalized" letters.

Magic Worksheet

The spreadsheet package included with the T100 is *Magic Worksheet* by Structured Systems Group.

As with *Word Right,* the documentation is for a "typical" CP/M system. The 212-page manual is very complete and includes an 82-page tutorial section with plenty of examples and screen illustrations. In addition to this helpful printed information, *Magic Worksheet* also has a built-in Tutor subprogram, a Help key for detailed explanation of any command, and the option of having a short instructive message appear each time a command key is pressed. With all this help, it would be tough not to learn how to make effective use of *Magic Worksheet.*

Two cub scouts play with a T100 at the Toshiba Display Center on the Ginza in Tokyo. Unfortunately, the games that had them entranced are not available in the U.S.

Two unexpected software packages included with the T100 are MatheMagic and GraphMagic by International Software Marketing.

The package can create a spreadsheet of up to 1014 columns and up to 255 rows. It supports the expected spreadsheet operations and, in general, is very similar to the original *VisiCalc.*

Problem Solving

Two unexpected software packages included with the T100 are *MatheMagic* and *GraphMagic* by International Software Marketing. Unlike the other packages, the documentation is produced specifically for the T100. Two booklets are included with *MatheMagic,* a User's Guide and Sample Applications.

MatheMagic is a package for solving mathematical and business problems that can be expressed by one or more formulae. In many ways, it is like a powerful scientific calculator, but the package goes one step further in that it can "back in" to solutions that cannot be directly calculated from your equations. It is an outstanding tool for solving simulations in mathematics, physics, electronics, and business. The 12-page booklet of examples barely begins to scratch the surface of possibilities.

GraphMagic is a graphics package which helps create charts and graphs from data entered directly from the program or retrieved from *MatheMagic, Magic Worksheet, SuperCalc,* or *dBase II.*

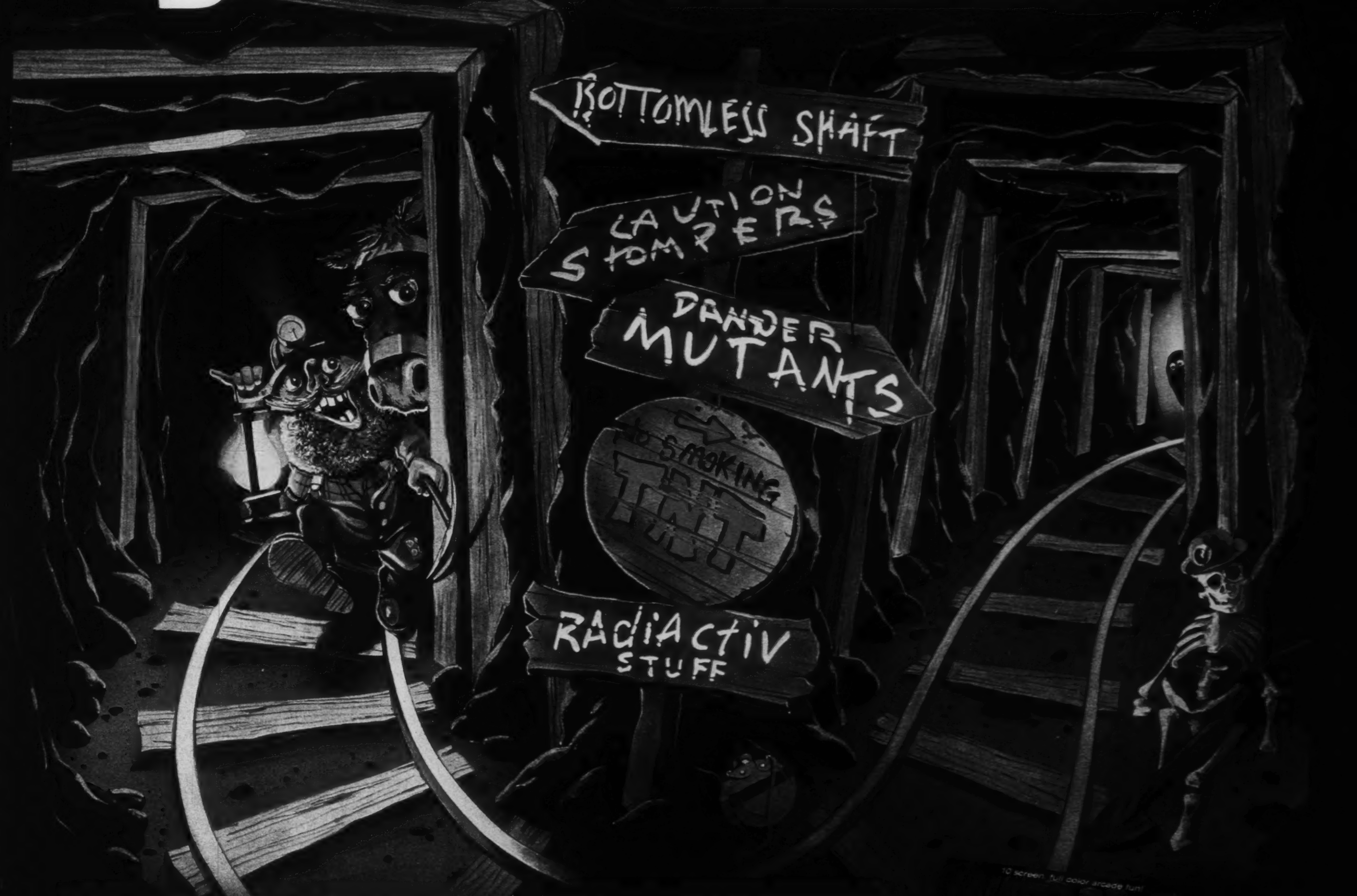
GraphMagic is a menu-driven system. The software, in combination with the T100-specific 54-page manual, makes it very easy to create high-resolution bar, line, and pie charts. We would have liked some screen illustrations in the manual, but managed to muddle through without them.

As with printing graphics in Basic, only the Toshiba 1010 and 1150 printers are supported.

Other Software

Dr. Reisman tells us that in addition to the software packages mentioned above, a bundled T100 also includes *Analyst, Q-Sort,* and *Prism,* an illustrated and animated story about a boy's quest for three magical keys of color. The keys exist in real life and are hidden in three

It'll blow your mine.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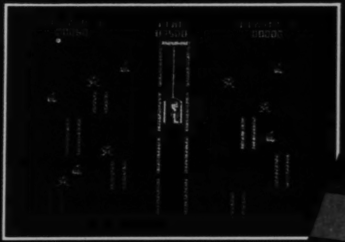

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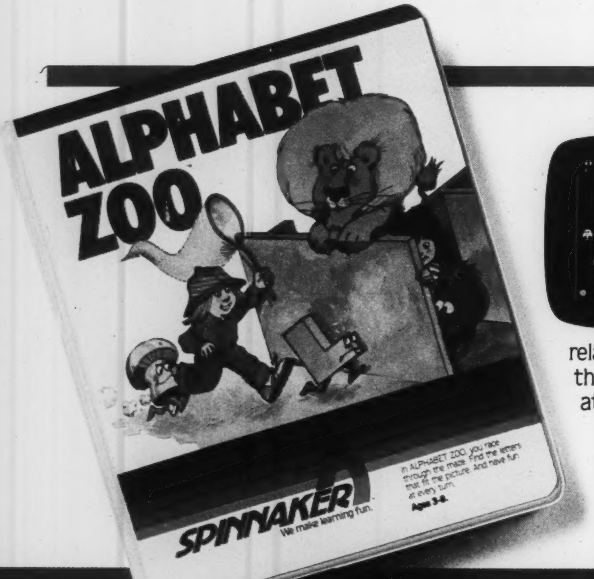
ALPHABET ZOO
In ALPHABET ZOO, you race through the maze. Find the letters that fit the picture. And have fun at every turn.
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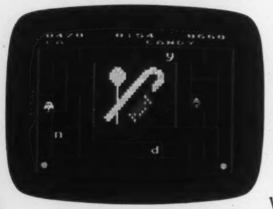
A trip through ALPHABET ZOO.™ Ages 3-8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0154
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CANDY
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It's a race. It's a chase. It's Alphabet Zoo, the exciting game that will have your kids zipping through the maze, after letters that fit the picture on the screen.

And at the same time, your kids will be learning the relationship of letters and sounds, and sharpening their spelling skills. So they'll be laughing and learning at every turn.

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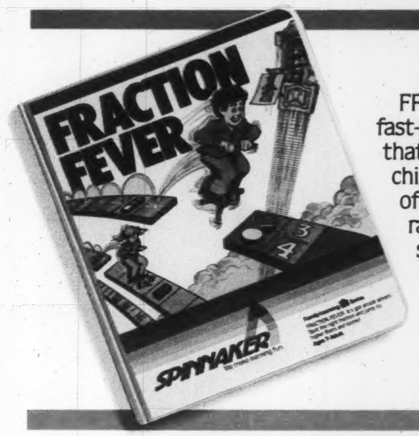

FRACTION FEVER™ brings fractions into play. Ages 7 to Adult.

FRACTION FEVER is a fast-paced arcade game that challenges a child's understanding of fractions. As kids race across the screen in search of the assigned fraction, they're actually developing a basic understanding of what a fraction is and of relationships between fractions. They're even discovering that the same fraction may be written in a number of different ways.

All in all, FRACTION FEVER encourages kids to learn as much as they can about fractions – just for the fun of it!

KINDERCOMP™ Numbers, shapes, letters, words and drawings make fun. Ages 3 to 8.

KINDERCOMP is a game that allows very young children to start learning on the computer. It's a collection of learning exercises that ask your children to match shapes and letters, write their names, draw pictures, or fill in missing numbers. And KINDERCOMP will delight kids with colorful rewards, as the screen comes to life when correct answers are given.

As a parent, you can enjoy the fact that your children are having fun while improving their reading readiness and counting skills.

KINDER COMP
GREAT!
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DELTA DRAWING
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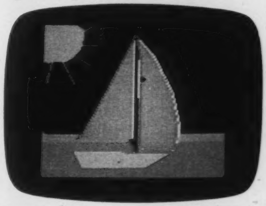
DELTA DRAWING™ Have fun creating pictures and computer programs. Ages 4-Adult.



Kids love to draw. And DELTA DRAWING Learning Program lets them enjoy creative drawing and coloring while they learn computer programming concepts. As they use simple commands to put lines and colors in their drawings, they're actually writing computer programs!

With DELTA DRAWING, even kids who have never used a computer before can learn to do simple programming and build an understanding of procedural thinking. It's easy, clear, and lots of fun!

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Cartridges for: Atari, Commodore 64

T100 computer system with Toshiba 1010 printer.

Computer, LCD display and modem in portable carrying case.

locations in the U.S. To find the keys, you must unravel clues hidden within the *Prism* story.

Two other programs are on the *MatheMagic* disk, TbPUT and TbGET. These are utility programs that allow files to be transferred between CP/M and T100 Basic operating systems, and vice versa.

Documentation

As with so many otherwise outstanding computers, the documentation for the T100 is a mixed bag. It is neither the best nor the worst we have seen; indeed, for a Japanese machine, it is quite good.

The 120-page Owner's Manual is divided into four parts and six appendices. Part 1 describes setting up the system in great detail and Part 2 describes basic system operation. Both sections are generously illustrated and written in an easy-to-read tutorial style.

Part 3 is a trouble-shooting guide which, it is to be hoped, will never be needed. Part 4 is a five-page introduction to writing Basic programs which is woefully inadequate for a beginner and rather trivial for an experienced programmer.

The Programmer's Reference Manual is, as its name implies, a reference manual, and not a tutorial. Section 1 is a 20-page guide to using CP/M and ten of the included utility programs.

The bulk of the manual, 170 pages, is devoted to describing the commands, statements, and functions of T100 Basic. It is excellent for an experienced programmer, but the first-time user will want to obtain one or more tutorial guides and books of sample programs.

The appendices describe disk I/O and Basic utilities, as well as presenting several useful lists (error messages, character sets, etc.).

As mentioned earlier, each applications software package is accompanied by a manual provided by the manufacturer of that particular package. For the most part, these are very good.

Each hardware component is accompanied by a small booklet designed to be inserted in the three-ring Owner's Manual binder. These guides are well-written and nicely illustrated.

Warranty and Service

The T100 and peripherals are covered by a 90-day limited warranty which covers the usual defects in workmanship and material, as well as non-conformity with Toshiba's standard performance specifications. After the initial 90 days, you are on your own.

Service is available from Toshiba dealers, regional service centers, or the corporate service center in Tustin, CA.

Pricing

Although the components are available separately, Toshiba offers a very attractive price on a system with software bundled in. Also, the components of the portability kit are offered in an attractively priced package.

The individual prices are as follows:

T100 computer/keyboard	$795
Dual disk drive unit	945
Monochrome monitor	255
RGB color monitor	895
LCD display	295

A bundled system includes the T100, dual disk drive unit, monochrome monitor, CP/M 2.2, T-Disk Basic, *Magic Worksheet, Word Right, MatheMagic, GraphMagic, NAD, Analyst, Q-Sort, Prism,* and several utilities for just $1995.

The Portability Kit includes the LCD display, LEX-12 modem, 16K RAM pack, hardside attache case, and cables for $795. A 32K RAM pack adds $90.

Toshiba Means Business

All in all, the T100 is an exceptionally capable computer system at a very attractive price. It has been on sale in Japan for about a year and has logged many thousands of hours of successful and reliable service.

The T100 is a no-nonsense business system, although its exceptionally high-resolution color display coupled with an excellent version of Basic make it quite suitable for many CAD, graphics, and entertainment applications as well.

The inclusion of CP/M 2.2 means that many software packages can be easily converted to run on the system. This should enhance its utility for many varied applications.

The documentation is weak in spots, but books from independent publishers are available to make up for these lapses. We were disappointed that the T100 does not support the top-of-the-line P1350 printer, but we understand Toshiba's rationale for not supporting a $2200 printer with a $1995 computer system.

After a few days use, we found ourselves regarding the T100 as the standard of comparison for easy-to-use, high-resolution graphics. The day came all too soon when the system had to be returned to Tustin. □

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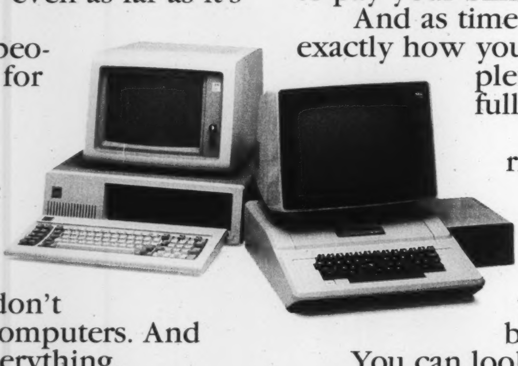


Where have all the dollars gone?

Dollars and Sense saves you money by organizing your money. By giving you the clearest picture you've ever had of your financial behavior.

You can establish budgets along any lines you like. Monthly or annually. Fixed or variable. On up to 120 accounts.

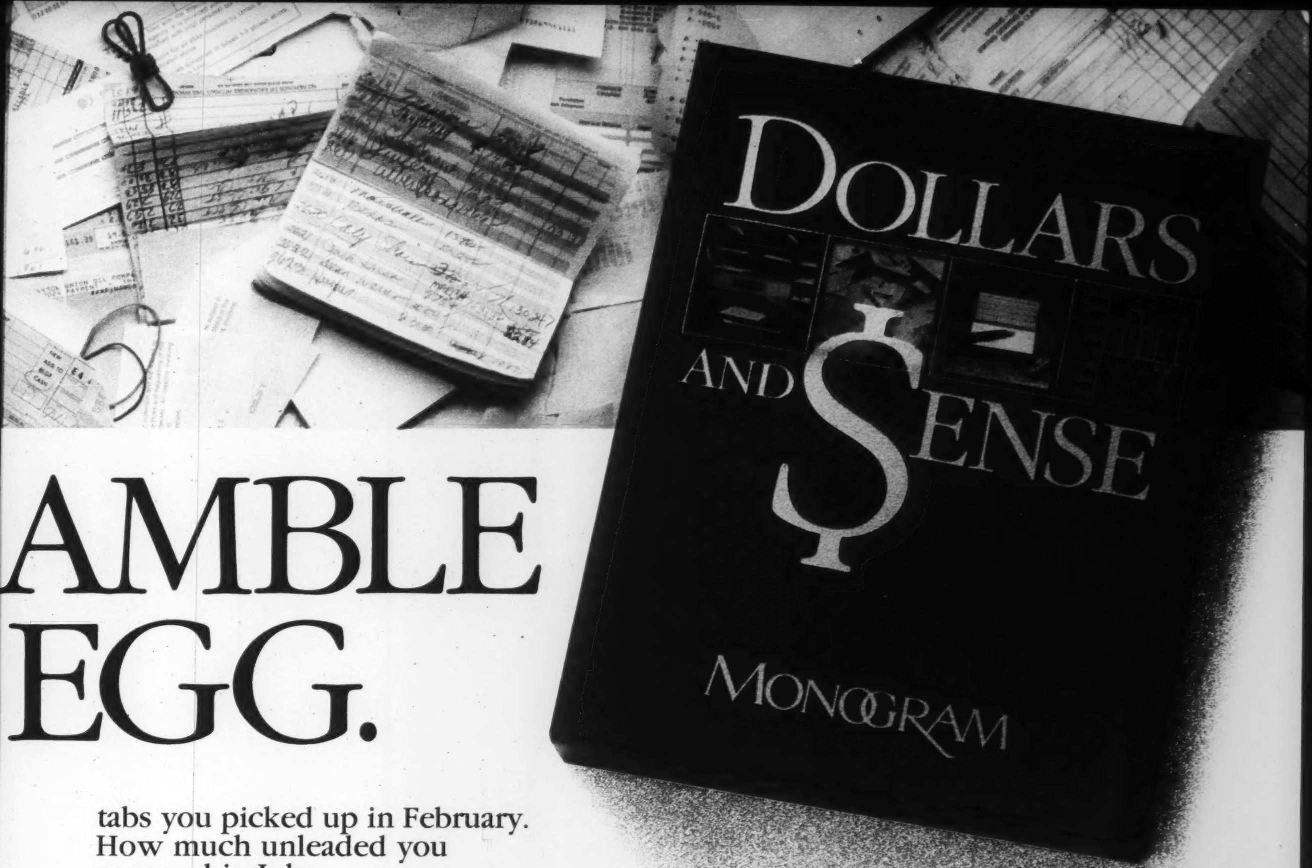
It can write checks, make transactions automatically, even remind you to pay your bills.

And as time goes by, it tells you exactly how you're doing. With a complete set of reports and full-color graphs.*

Year-to-date summaries. Income statements. Balance sheets. Cash flow analyses. Monthly and yearly comparisons of where you wanted to be vs. where you are.

You can look into the future to discover how much damage that new car, new driver, new dress or new baby will do to your budget.

Or look into the past to find out anything you like. Like how many bar



AMBLE EGG.

tabs you picked up in February. How much unleaded you pumped in July.

Or whether your utility bills have gone far enough through the ceiling to justify a new roof.

And all you have to do is spend a few minutes each week telling your IBM® PC, Apple® II or IIe what came in and what went out.

Tax break.

You can use Dollars and Sense around the house or around the office.

And around April 15, you'll be glad you did. Because a few simple keystrokes will present you with all the information you need to satisfy Uncle Sam.

If you do your own Long Forms—or your own loan applications—you'll save time. If someone else does them for you, you'll save money.

Year after year.

User friendly. Really.

Dollars and Sense also happens to be very easy to use. For everyone who uses it.

If you're a novice, at computing or accounting or both, don't worry.

The interactive demonstration disk will get you started. And the program will keep you going. With sample accounts, on-screen prompts and two different beeps.

One for typographical errors. And another for other kinds of errors.

As you get faster, so does Dollars and Sense. You can enter and edit large amounts of information, right on the screen. Move from function to function without waiting around. And get instant, up-to-date reports.

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*Color monitor required

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creative computing equipment evaluation

NEC PC-8800 bundled system includes system unit, keyboard, dual disk drives, and monochrome monitor.

NEC PC-8800 Personal Computer System

David H. Ahl

In the PC-8800, NEC Home Electronics USA has introduced a computer that belies their name. The PC-8800 is a professional business machine and hardly a home computer—although everyone who has seen it covets one for his home.

The bundled system is especially attractive as NEC has packaged together the keyboard, system unit, dual disk drives, monochrome monitor, CP/M 2.2, Microsoft Basic, *Multiplan*, *WordStar*, and *MailMerge* at an inviting price of $2497. We have come to expect barely adequate documentation with many Japanese imports. Surprise! The documentation with the PC-8800 is absolutely outstanding. For these reasons and others we discuss below, the system must be considered a top contender in the small business systems market.

The Basic System

The bundled PC-8800 system comes in four cartons. The first contains the PC-8801A system unit (NEC calls it the "body") and a detachable keyboard.

The body is the heart of the system and contains the cpu, memory, interface circuitry, and I/O connectors. It measures 19.5" × 13.5" × 4.2" and makes a very suitable base on which to place the monitor.

Bundled PC-8800 system set up for our evaluation.

creative computing

HARDWARE PROFILE

Product: NEC PC-8800 Computer System

Type: Small business computer

CPU: 8-bit Z80A (optional 8086)

RAM: 64K included, 512K maximum

ROM: 72K

Keyboard: Detached, 92 full stroke keys

Text resolution: Up to 80 characters × 20 lines

Graphics resolution: Color 640 × 200 pixels, monochrome 640 × 400 pixels.

Colors: 8 primary, 60+ mixed

Sound: One tone beep

Ports: RS-232 serial, Centronics parallel

Documentation: System manual, Basic manual and reference booklet, CP/M manual, manuals with each applications software package. Among the best documentation we've seen.

Pricing: Bundled system (see text) $2497

Summary: Exceptional color graphics, excellent Basic, reliable and capable hardware and software. A remarkable system for the price.

Manufacturer:

NEC Home Electronics USA
1401 Estes Ave.
Elk Grove Village, IL 60007

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Computer Advanced Ideas
CAI
MASTER MATCH
Wizard of Words
GAME SHOW
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The day you bring your first CAI™ learning game home and watch your child play, you'll know the excitement of a winning choice.

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Your family and CAI's growing family of animated, full-color programs have a lot to share —beginning with a willingness to reach beyond the ordinary to achieve the best.

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You may meet a princess, a juggler or a dragon in *Wizard of Words.*™ You may appear as a guest on TV in *Master Match,*™ *The Game Show*™ or *Tic Tac Show.*™ Or, you may extend these programs still further with our *LearningWare*™ diskettes, offering hundreds of questions matched to the teaching strategies in the games. In every case, CAI puts a world of imagination and learning at your fingertips. And puts you and your child in control.

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CAI supports its products —and you —with an unconditional guarantee and a free backup disk. And provides compatibility with the most popular computers: Apple,® IBM® (and soon Commodore™).

Wise Choice

CAI is a group of experienced educators and programmers who believe that success begins with opportunities you create at home. Ask to see a demonstration of CAI programs at your local computer store, and see for yourself just how rewarding a good education can be.

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Challenge yo

Make beautiful music. Everyone loves music. And anyone who has ever hummed a tune can write one, now. Scarborough has taken the universal language of music and developed a software program that makes it fun and easy to write songs for budding composers of any age.

Even those who don't recognize a single note can be composing songs in 15 minutes. Simulated piano roll graphics and on-screen commands serve as a guide every step of the way — from scales and rhythm to more complex musical forms and theory.

With Songwriter, composing songs is as simple as "do-re-mi." Write a song, change, delete or add a note, change tempo and teach the computer to repeat musical motifs. Even save compositions to play back through the computer or your home stereo. For added fun, there is also a library of 28 popular songs to listen to and experiment with, as well as a series of educational activities for adults and children.

Songwriter is like a word processor for music that will bring the whole family back to the computer, again and again — because Songwriter encourages experimentation and makes the whole process fun. Isn't that why you bought a personal computer in the first place?

Every kid has a song in his heart. (So does the "kid" in every parent!) Help yours express it with Songwriter.

Available for Apple,® Atari,®
Commodore 64™ and IBM-PC® $39.95

Songwriter
Songwriter
by Art Bardige
Samuel Wa
For Ages 5 10 15
Apple II Plus/IIe, 48K.
Available for Atari, Commodore 64, IBM-PC.
Scarborough.
Scarborough.

The Scarboro

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CIRCLE 216 ON READER SERVICE CARD

ur creativity.

PictureWriter™
by George Brackett. PictureWriter — it's magic. Create any shape
Choose from a library of finished art
and replay your own creations. A step-b
gramming and editing for children
For Ages 5 15
Apple II Plus/IIe, 64K, Joystick.
Scarborough
PictureWriter
Scarborough

Be quick on the draw. PictureWriter is magic! Create any shape or pattern, instantly. Fill areas with glowing colors and even hear pictures set to music.

PictureWriter brings out the artist in anyone. With this program, your child can create his or her own picture gallery and watch the computer redraw the pictures like magic on the screen. PictureWriter also includes a library of masterpieces by other "picture writers" that can be colored, edited and redrawn.

Like all Scarborough programs, PictureWriter encourages experimentation and continually challenges the child to explore new avenues. And all the while, PictureWriter subtly develops the child's familiarity with the fundamentals of step by step computer programming.

Getting started is simple. The built-in tutorial zips the artist into the program quickly and keeps him or her creatively occupied for hours.

The possibilities are endless with PictureWriter. In fact, children find it so captivating that parents will probably want to doodle with it, too. And why not?

You can't stay an adult forever.

Available for Apple® $39.95
(Soon, Atari®)

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ugh System.

NEC PC-8800, continued...

On the front of the body is a pushbutton off/on switch (hurrah—no elusive rocker switch in the back), a recessed reset switch, a red power-on LED, and a green LED indicating the use of N88-Basic. More about this later. Under the power switch is a 14-pin keyboard connector.

The rear is cluttered with every imaginable type of connector. Three DIN connectors are provided for the color display, monochrome display, and cassette recorder. It is unfortunate that the connector for the color display and cassette recorder are the same; this encourages confusion. D-type connectors are provided for a PC-8031A floppy disk unit, printer, and RS-232 device. A power cord jack rounds out the collection of exposed connectors.

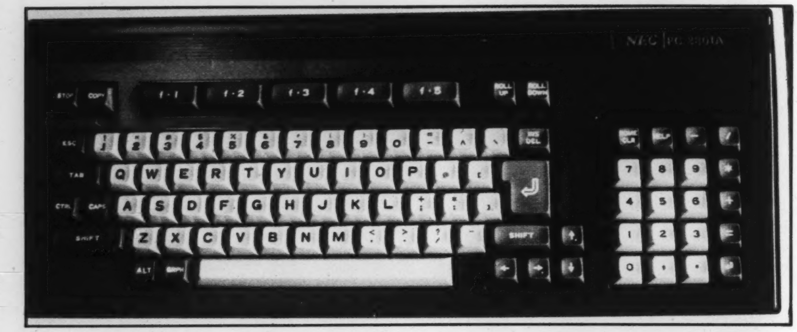
Four bus expansion slots are covered by metal plates. It is into these slots that controller boards are inserted for the standard disk drives (8881A, 8882, 8831A, and 8832A), speech synthesis units, and other peripherals.

Also on the rear are two DIP switches and two jumper switches. These will generally be set once and forgotten. They control such things as which Basic is operative, screen resolution, and communications parameters. They are thoroughly explained in the PC-8801A User's Guide.

Indeed, the entire system set up from unpacking through system use is illustrated and described in the User's Guide. This excellent 157-page manual should be the model for the industry; we have never seen better.

Ergonomic Keyboard

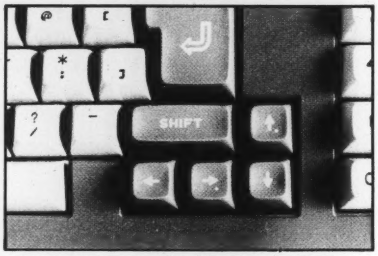
It is fashionable today for manufacturers to describe their keyboards as "ergonomic," whether they are or not. The one on the 8800 is. Character and number keys are matte finished in light gray while special keys are dark gray. The 92 keys are divided into three sections, a qwerty alphabetic section, numeric keypad, and a row of function keys. The keyboard measures 18.3" × 8.4" × 2.8" and plugs into the system unit by means of a coiled cable.


The system has a truly ergonomic keyboard.

The alphabetic portion of the keyboard is truly standard with shift, caps lock, and tab in the customary place on the left. Unfortunately, there is no LED caps lock indicator, something we have missed since the bygone days of the Teletype 33 and Sol 20. One extra key (underline) at the right end of the bottom row moves the right shift key slightly further to the right than one might expect.

The carriage return key is double size, and special symbols are on keys at the right of the alphabetic keyboard. We found it curious that although all of these extra keys produce two symbols (regular and shifted), six keytops displayed only one symbol.

Actually, each key on the keyboard produces up to four characters. These include the usual upper- and lowercase letters, numerals, and symbols marked on the keytops. In addition, if the GRAPH key is depressed, 56 graphics symbols can be produced. If the ALT key is depressed, the regular keys will produce an additional 64 Greek letters and mathematical symbols. In all, the 8800 has 212 built-in characters, all of which are accessible from the keyboard.

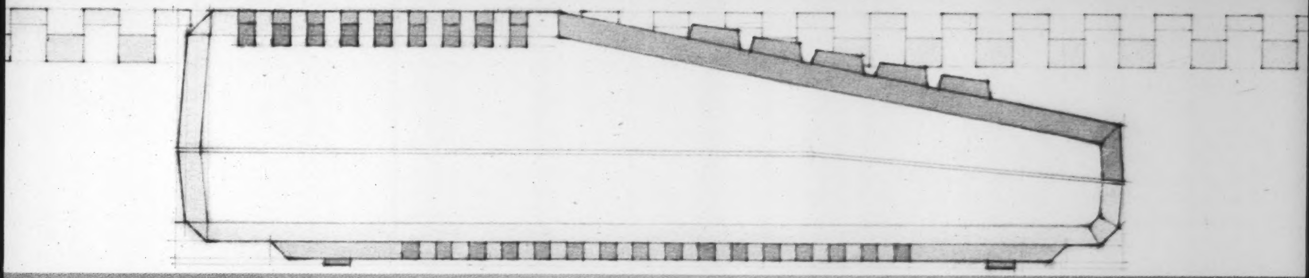

RETURN key is double size and cursor control keys are arranged reasonably logically.

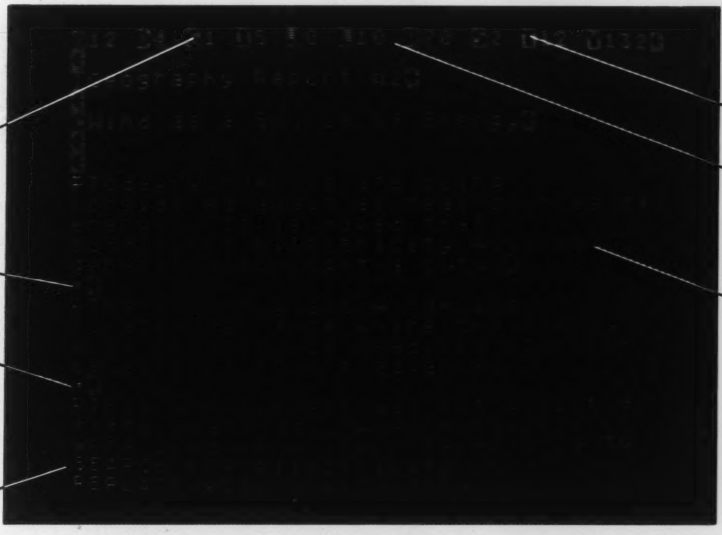
The numeric keypad at the right side of the unit has 20 keys for the ten numerals, arithmetic operations, comma, period, RETURN, HOME/CLR, and HELP. The HELP key is a great aid when debugging programs. When an error occurs during program execution, pressing HELP displays the statement and image where the error occurred.

The four cursor control keys are grouped next to the shift key at the right

YES,をあげます。
NEC パーソナルコンピュータ PC-8000シリーズ
Bit-INN
In Japan, NEC operates a chain of Bit-INNs and demonstration centers where people can go and use any of the computers in the NEC line.

At a NEC demo center in Tokyo, prospective customers try out small business systems.





Prints with built-in format or lets you create your own: center, underline. Boldface, elongated, proportional and condensed print.

Inserts and deletes characters, lines or blocks of text.

Duplicates and moves blocks of text.

Searches for and/or replaces words or phrases, one at a time or all at once.

Changes line spacing, margins, print type, paragraph indents anywhere in the document.

Instantly reformats.

Enters text easily, with word wrap, one main menu and helpful prompts.

Creates multi-line headers and footers.

Prints double columns, form letters, multiple copies of a page or document, at the touch of a key.

Numbers pages and creates section numbers automatically.

Corrects spelling (with extra software).

Chains and merges files.

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You can't find a friendlier, more powerful word processor at twice the price. New AtariWriter.™ Under $100.

Now you can do multi-featured word processing at home, simply. At a family budget price.

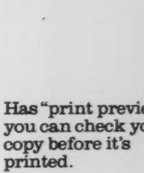
Our ROM-based cartridge technology means you can use new AtariWriter on any ATARI® Home Computer (even 16K) for personal and business correspondence, term papers, committee reports, mailings, etc.

It also lets you choose between cassette and disk storage systems.

One very special AtariWriter feature: you can correct as you write, without switching back and forth between Create and Edit modes.

And our memory buffer offers an "undo" command to let you change your mind, and restore text you've just deleted.

Check into our remarkable AtariWriter, and our choice of letter quality and dot matrix printers, also reasonably priced, at Atari dealers. Call 800-538-8543 for dealer nearest you. In California, call 800-672-1404.



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end of the keyboard. They are in a reasonably logical arrangement, although we prefer the diamond pattern on the portable NEC PC-8201 computer. These keys, along with the INS/DEL (insert/delete) key, are used for on-screen editing of Basic programs as well as for cursor manipulation in other application programs.

In the top row of keys are STOP (halts execution of a program), COPY (causes the display on the monitor to be printed, assuming a NEC 8023A-C printer is connected), ROLL UP and ROLL DOWN (scrolls the text image on the monitor up or down), and five function keys.

Each of the function keys produces two functions, regular and shifted. In Basic, the default definitions are load, run, auto, list, save, goto, key, print, edit, and cont. The keys can be user defined by means of the KEY statement. For example, KEY 1, "Creative" will cause Creative to be printed whenever Key 1 is depressed.

The system uses a responsive N-key rollover input which allows speedy, yet accurate entry for word processing and other applications. All keys repeat when held down for more than a half-second; but there is no audible keyclick to accompany key repeats.

On The Inside

The 8801A system unit uses an mpu equivalent to the Z80A running at 4 MHz. In our Basic benchmark program, the 8800 didn't break any speed records, posting times identical to the Apple II and Commodore 64.

The basic system is equipped with 64K of user RAM. It can be expanded to 128K with bank switching possible in 32K units. In addition, when N88-Basic is used, 48K of video RAM becomes operational.

A 32K ROM memory contains N-Basic and the monitor, while another 40K of ROM contains N88-Basic.

The system unit incorporates a NiCad battery to keep the time and date current once they are set. This is a very thoughtful touch, and one that is annoyingly absent on most other computers in this price range.

For those who need such information, the manual provides system block diagrams, a memory map, and pin-outs for all the connectors and the expansion bus.

Disk Drives

The standard disk drive included with the bundled 8800 system is the PC-8831A with dual double-sided, double-density, 5¼" drives. Alternatively, an 8" dual double-sided, double-density drive (PC-8881A) is available. Matching dual expansion drives can be added to both size drive units. For maximum economy, a dual single-sided, double-density, 5¼" drive (PC-8031A) is also available.

We tested the 8831A unit which is included with the bundled system. When formatted, each side of each disk stores 160K; thus the dual unit stores 640K on line.

The drive is reasonably compact, measuring 7.6" × 9.8" × 14.2". The power switch is awkwardly placed at the right rear. A dim, green LED on the front indicates when power is on. The drives should be powered up before turning on the system unit.

When power is applied to the unit, the drives do not rotate. The motor goes on only when a read or write operation is initiated by the computer. However, the drive then continues to spin for 2½ minutes, so subsequent disk operations are immediate and do not require a wait while the disk gets up to speed. If the drive is not accessed for 2½ minutes, the motor shuts down. We judge this an excellent way to speed disk response time

If buying a car was like buying software, you'd see a lot of these on the road.

A flashy vehicle. No doubt the result of several great ideas. But hard to drive with the performance you expect.

Until now, buying business software was similar, a lesson in irregular mechanics. Sure, you can put together all of your own pieces, but will the resulting vehicle give you the performance you expect? If you need consistent operation, easy response, smooth on the straights yet tight on tough corners, we have the answer.

Executec software:
the secret's in the system.
One completely integrated software system provides decision support and office automation in a uniform, consistent environment. Software that gives you the power to challenge the total range of business problems by using one synergistic structure.

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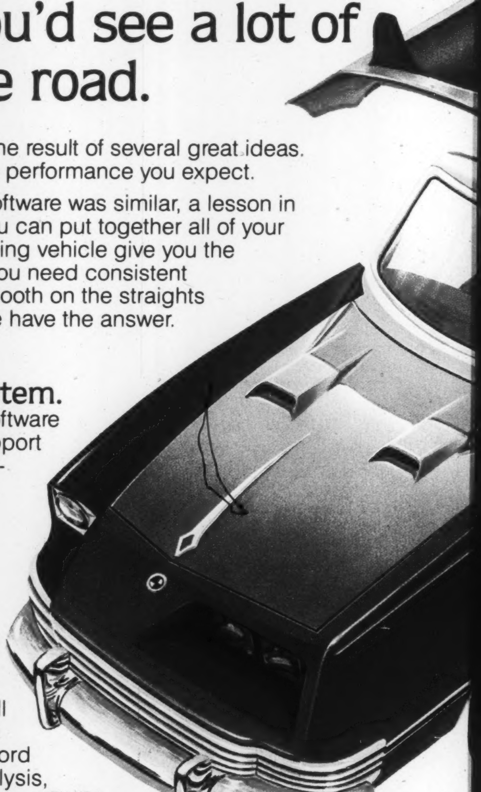
We call it SeriesOnePlus. You'll call it incredible. Start with the programs you need most — word processing, spread sheet analysis, data management, and the Execu/BUS* master program. Assemble any of the eight additional programs available** for even more problem-solving capability. Now you can easily command the resources you constantly need at your fingertips.

*Patent Pending

**Additional programs available: Execu/REPORTER™ – report writer; Execu/PLOT™ – graphic analysis; Execu/LINK™ – 3780 communications for the IBM® PC; PromptDoc™ – user documentation program; plus Fixed Asset Accounting and three other financial industry products.

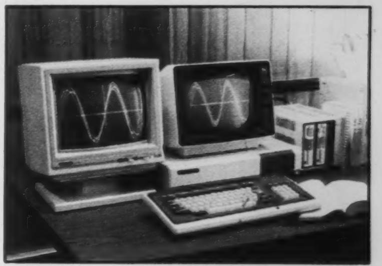
SeriesOnePlus is available on the IBM® PC, Pronto® Series 16, Durango Poppy®, DEC Rainbow®, Wang® PC, Victor® 9000, and many other 16-Bit MS-DOS computers.



while saving wear and tear on the drive motor.

A red LED indicator on each drive indicates when a read or write operation is taking place; these lights glow at 20% of full intensity when the drives are in the standby state.

The User's Guide provides extensive illustrated instructions for using the drives; handling, formatting, backing up, and copying disks; loading N-Disk-Basic and N88-Disk-Basic; maintenance; and troubleshooting.



For our evaluation we hooked up an RGB color monitor simultaneously with the included monochrome monitor.

The disk drive is furnished with a system disk that contains both disk Basics, six utility programs, and four demonstration programs.

The bundled PC-8800 system has three additional disks containing CP/M 2.2 and the various applications software packages.

Output Display And Monitors

NEC is a major producer of TV sets and display monitors, so it should come as no surprise that the company offers a choice of six monitors with the PC-8800 system.

As mentioned earlier, the one bundled with the standard system is the JB-1201, a 12″ green phosphor monochrome monitor with resolution of up to 640 × 200 pixels. The monitor also has audio capabilities. Two pairs of RCA jacks are provided for video and audio in and out.

The front of the monitor has three controls for brightness, contrast, and volume. Five additional adjustments are provided on the back.

The monitor is tilted back at a 5-degree angle and has no provision for adjusting tilt or swivel.

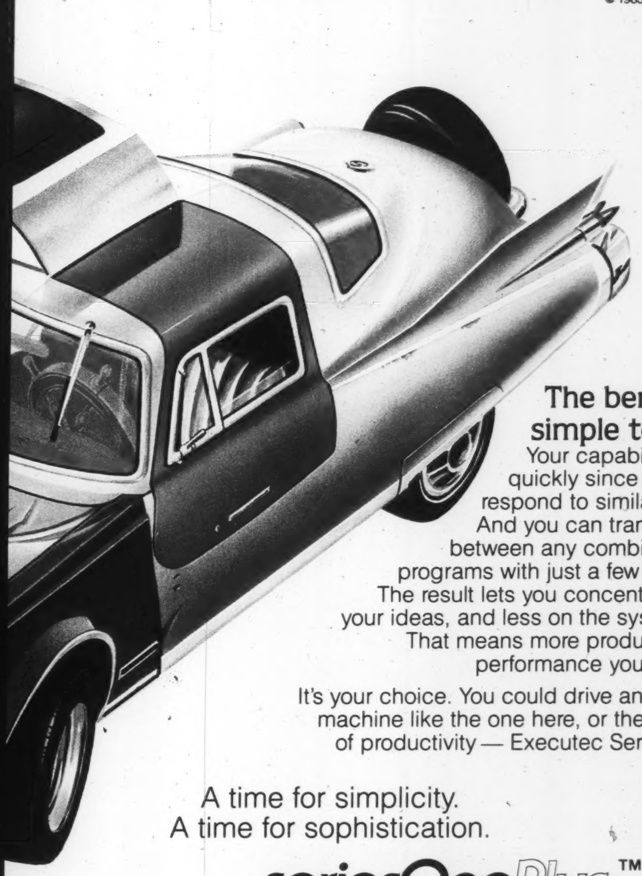
Economy 12″ and 9″ monochrome units are available, as well as an upper-end 14″ unit with a resolution of 640 × 400 pixels.

Two color monitors are available. The top-of-the-line unit is the JC-1410, a 14″ RGB monitor capable of displaying up to 640 × 400 individual pixels. A smaller, less expensive 12″ RGB unit has a 640 × 200 pixel capability.

For many business applications, the 12″ monochrome monitor is perfectly satisfactory. However, the computer is capable of producing spectacular, high-resolution graphics, and it seems a shame to waste this capability with a monochrome monitor. On the other hand, the price differential is $600 or more—enough to make one think twice.

We tested the PC-8800 system with both the included monochrome monitor and a Toshiba high resolution RGB monitor attached simultaneously. For text, the monochrome monitor was slightly better, but for anything with color, the RGB unit was far superior.

The PC-8800 is capable of producing three text formats: 80 characters by 20 lines, 40 by 20, and 40 by 25. Characters are formed with a 5 × 7 dot matrix; descenders use one additional row of dots. With 20 lines on the screen, interline spacing is two rows of dots; this is reduced to one row with 25 lines on the screen. The descenders on lowercase letters use this spacing line, making readability very difficult in this format.



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The benefits are simple to achieve.

Your capability develops quickly since all programs respond to similar commands. And you can transfer data between any combination of programs with just a few keystrokes. The result lets you concentrate more on your ideas, and less on the system details. That means more productivity, the performance you expect.

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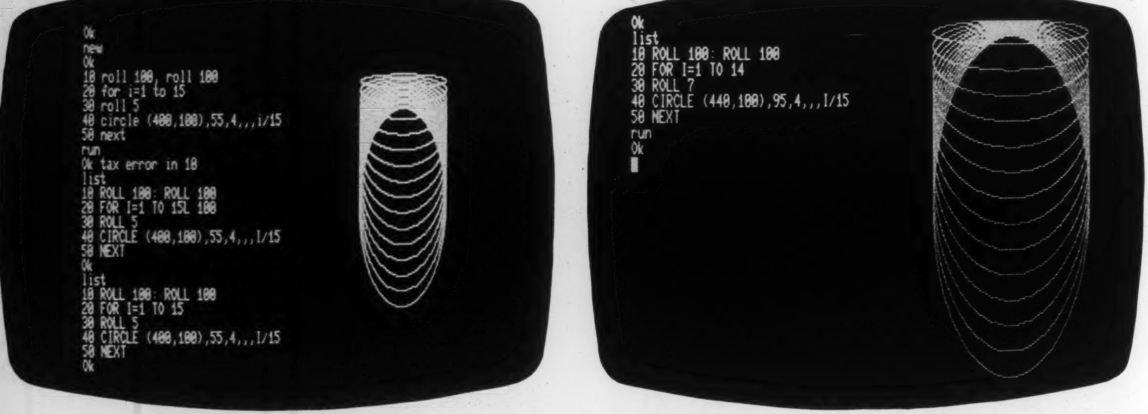


```
Ok
new
Ok
10 roll 100, roll 100
20 for i=1 to 15
30 roll 5
40 circle (400,100),55,4,,,i/15
50 next
run
Ok tax error in 10
list
10 ROLL 100: ROLL 100
20 FOR I=1 TO 15L 100
30 ROLL 5
40 CIRCLE (400,100),55,4,,,I/15
50 NEXT
Ok
list
10 ROLL 100: ROLL 100
20 FOR I=1 TO 15
30 ROLL 5
40 CIRCLE (400,100),55,4,,,I/15
50 NEXT
Ok
```

```
Ok
list
10 ROLL 100: ROLL 100
20 FOR I=1 TO 14
30 ROLL 7
40 CIRCLE (440,100),95,4,,,I/15
50 NEXT
run
Ok
█
```

It is easy to debug graphics programs as the text screen and graphics screen are independent. Here, we have written a simple four-line program to produce an image and then increased the radius of the circle.

All the application software we examined used the 80 × 20 mode with occasional use of the 40 × 20 mode for titles. In Basic, these modes are set by means of the WIDTH or CONSOLE command.

N-Basic has several additional text screen modes. It allows all combinations of 80, 72, 40, or 36 characters by either 20 or 25 lines.

The system discriminates between the text screen and graphics screen. Instructions in Basic are provided to alter each screen independently so that a change in one does not affect the other. This is a marvelous feature for writing and debugging graphics programs since the graphics output remains on the screen as the program is listed and changed.

The graphics screen is actually composed of three 640 × 200 pixel planes, each one of which can be controlled and set independently. Each plane corresponds to one of the three color guns: red, green, and blue. By combining these colors, eight distinctly different colors can be produced. However, by setting small groups of dots to different color patterns, it is possible to achieve some 60 different colors, hues, and patterns.

Although it is possible to manipulate each plane, most users will want to take advantage of the extensive graphics commands built into the two versions of Basic. However, for programmers wishing to use detailed graphics, the Basic Reference Manual provides excellent instructions, and the system disk has two excellent example programs.

Data Recorder

The NEC PC-6082A data recorder is similar to a standard cassette recorder, but it is especially designed for consistent reading and writing of programs and data on tape. On the other hand, any standard cassette recorder can be used with the PC-8800. Default transfer rate is 1200 baud, but this can be set in Basic to 600 baud for lower quality recorders.

The 6082 unit has the usual cassette recorder controls augmented by five program search buttons that help locate specific programs on a tape quickly.

Our judgment is that most PC-8800 users will use floppy disks as their primary storage vehicle. But for those who want cassette capability, it is available. For example, we picked up several 8800 programs in Japan that were on tape which we had to read in to transfer over to disk. We accomplished this effortlessly with a standard recorder, although if we were using tapes on a regular basis, we would probably want the NEC unit.

Powerful Basics

The NEC PC-8800 comes with two powerful versions of Basic, N-Basic and N88-Basic. Both can be used with and without disk drives. The N88-Basic is the primary programming tool of the PC-8800. It is a super-set of the original N-Basic with several extended instructions added to take advantage of the hardware.

We did all of our testing with N88-Basic as we believe the majority of PC-8800 users will choose to use that version. N-88 Basic is written by Microsoft and has all the familiar commands, statements, and functions. However, it has many additional capabilities, mostly having to do with graphics and files.

As mentioned earlier, three 640 × 200 pixel planes of graphics can be independently produced. The SCREEN command selects the desired plane(s) to be displayed on the screen.

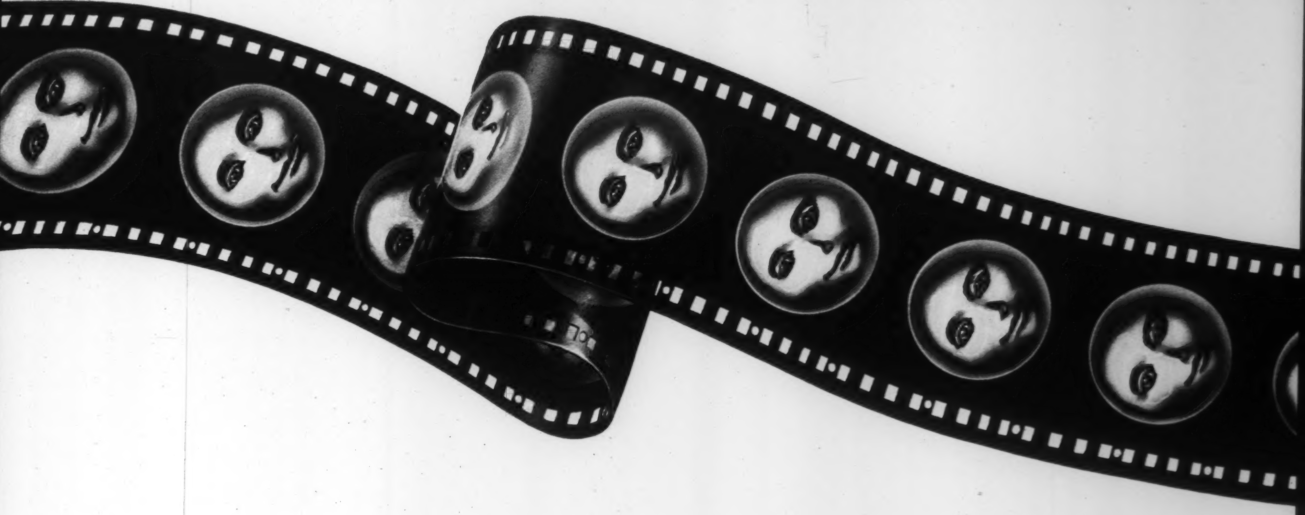
The rich variety of available graphics commands are a programmer's delight. Here are some examples.

- GET@ saves a graphics pattern from the screen into an array.
- PUT@ displays the pattern saved with the GET@ command.
- CIRCLE is a generalized statement to draw an ellipse, circle, or arc of any radius, color, or aspect ratio.
- COLOR sets the background, foreground, and border color.
- COLOR@ sets character colors.
- LINE draws a line between user-defined points.
- PAINT fills in an area of the screen that has a graphic boundary.
- POINT is both a function which returns the last referenced screen coordinates, and a statement which can be used to change those coordinates.
- PSET and PRESET turn screen points on and off.
- ROLL scrolls the graphic screen up a specified number of pixels.
- WINDOW and VIEW are used to specify display areas on the screen which can be scaled and moved to another location.

File and device I/O commands are equally extensive and can reference three RS-232 devices, eight floppy disk drives, two cassette tape units, a lightpen, and printer. Three lightpen statements and one function are implemented for use with such a device.

Multiple program calls are supported with CHAIN, COMMON, and MERGE. Naturally, data can be passed to and from programs using disk files. These files can be either sequential or random. Although random files are more difficult to use (requiring the use of FIELD, GET, and PUT), the additional effort is rewarded with much faster data recovery in many instances.

A pause command for which we have felt a need for years is finally implemented on the PC-8800. WAIT sus-



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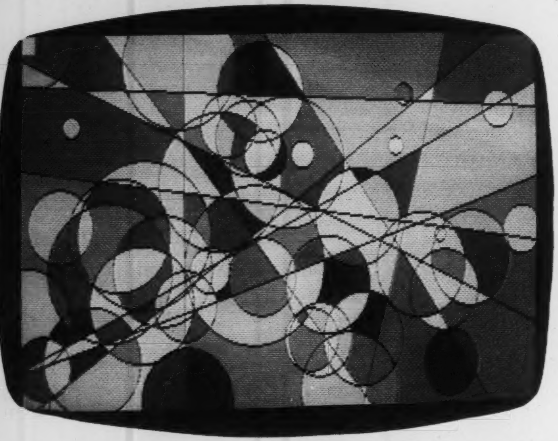
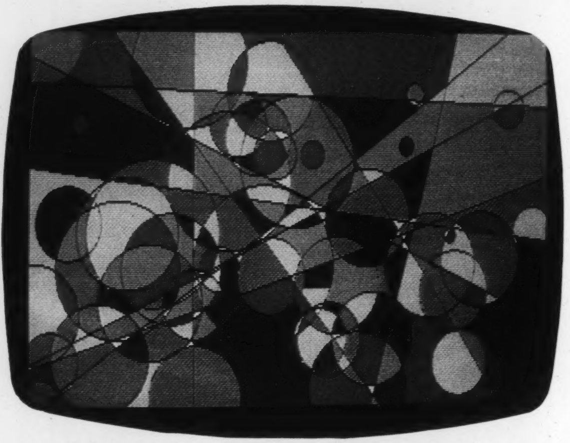




Program uses CIRCLE, LINE, and PAINT statements to produce an ever-changing display of "modern art." The first image is shortly after starting the program; the second is several minutes later.

pends program execution while waiting for specific input. Conversely, INPUT WAIT is used to accept keyboard input for a specified period of time. These are not the ultimate since they work only in conjunction with input, but combined with the real-time clock, they are a step in the right direction.

As we have come to expect, N88-Basic has full on-screen editing. The cursor can be moved to any point; a change, insert, or delete entered; and RETURN pressed to enter the change. The INS key turns on insert mode; pressing a cursor key or RETURN turns it off. This is far preferable to having to press the insert key for every character to be inserted.

With a 64K machine, N88-Basic can use 56,799 bytes. This is twice the amount of free memory that can be used with Microsoft Basic on many other 64K computers; on such machines, Basic seems artificially limited to addressing 32K or less. N88-Disk-Basic can access 45,410 bytes in a 64K machine. Naturally, if files are specified, buffer space must be allocated which reduces the amount of free memory.

The only notable omission in N88-Basic is any sound capability. Well, perhaps we shouldn't say "any," since Basic does have the BEEP statement, but that is a far cry from three channels with a five-octave range.

Documentation

As mentioned in the opening paragraph, the documentation with the PC-8800 is nothing short of superb. We have said that the 157-page User's Guide should be the model for the industry. The same can be said for the Basic Reference Manual.

Chapter 1 of the Reference Manual is a thorough discussion of the features of Basic including symbols, variable types, expressions, error messages, screen modes, colors, interrupts, and files.

Chapter 2 contains a comprehensive description of every Basic command, statement, and function. It has many examples, and, for more complex statements, includes two or three short programs showing the use of them.

This is followed by ten appendices, the first five of which contain longer sample programs illustrating some of the more complex statements and programming techniques.

Appendix G is devoted to a discussion of the machine language monitor. Although most computers can be programmed in machine code, it is a rare manual that provides any helpful information. This one not only provides the basic information, but also includes many examples of the use of each command.

The 262-page CP/M manual is exceptionally comprehensive and, like the Basic manual, includes many examples illustrating the use of each command and utility program. It is the best CP/M manual we have ever seen.

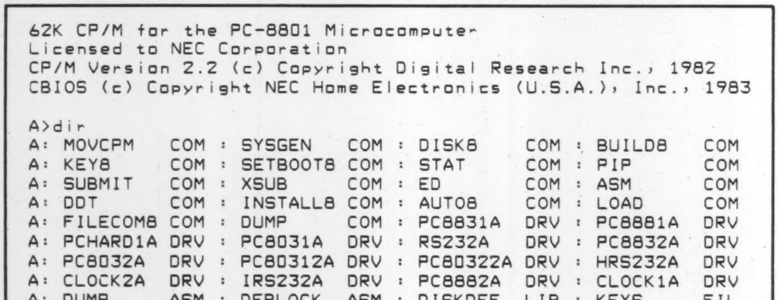
We are used to applications software manuals being prepared by the software producer with perhaps a sheet or two referring to the specific computer. Such is the case with the *WordStar* and *MailMerge* manuals. However, the *Multiplan* manual was specifically prepared for the PC-8800; this is a welcome change.

CP/M Operating System

Upon powering up the PC-8800 system with the disk drive on and the system disk inserted, the computer goes through a longish 15-second self check and disk load procedure, and finally comes up in Basic.

To get into CP/M, the CP/M disk is inserted when the system is powered up. After a shorter 8-second wait, the system comes up with the usual copyright notices and the A > prompt.

The CP/M disk contains 18 command files (sysgen, editor, pip, etc.), 14 device drivers (disk drives, RS-232, printer,



```
62K CP/M for the PC-8801 Microcomputer
Licensed to NEC Corporation
CP/M Version 2.2 (c) Copyright Digital Research Inc., 1982
CBIOS (c) Copyright NEC Home Electronics (U.S.A.), Inc., 1983

A>dir
A: MOVCPM   COM : SYSGEN   COM : DISK8    COM : BUILD8   COM
A: KEY8     COM : SETBOOT8 COM : STAT     COM : PIP      COM
A: SUBMIT   COM : XSUB     COM : ED       COM : ASM      COM
A: DDT      COM : INSTALL8 COM : AUTO8    COM : LOAD     COM
A: FILECOM8 COM : DUMP     COM : PC8831A  DRV : PC8881A  DRV
A: PCHARD1A DRV : PC8031A  DRV : RS232A   DRV : PC8832A  DRV
A: PC8032A  DRV : PC80312A DRV : PC80322A DRV : HRS232A  DRV
A: CLOCK2A  DRV : IRS232A  DRV : PC8882A  DRV : CLOCK1A  DRV
A: DUMP     ASM : DEBLOCK  ASM : DISKDEF  LIB : KEYS     FIL
A>stat
Bdos Err On A: Bad Sector
A: R/O, Space: 142k
```

Figure 1. Power up dialogue with CP/M and list of programs on the system disk.

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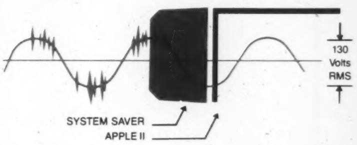

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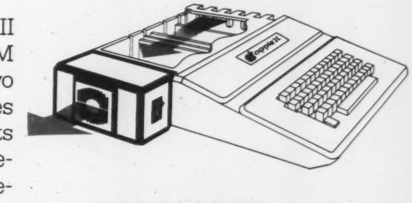

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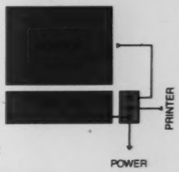

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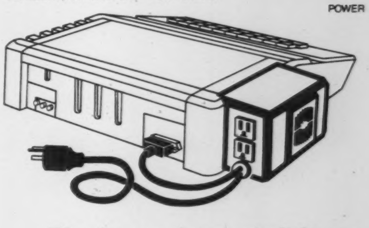

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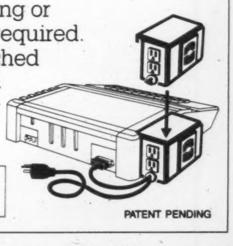

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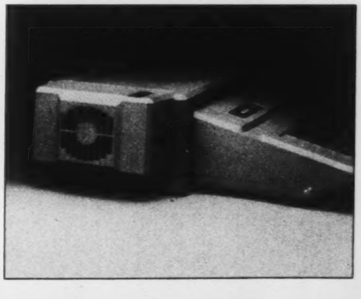

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clock, etc.), and four other files. It is a comprehensive library of utilities that allows the use of most of the capabilities of the system, except color graphics, as usual.

WordStar

The word processing program NEC has selected to bundle in with the PC-8800 system is *WordStar* by MicroPro International. This is a programmer's dream of a word processing system and has many features not found in other packages. On the other hand, it is not at all easy to learn and not at all what we would recommend for the occasional user.

The package comes with a single disk, formidable 200-page manual in a three-ring binder, reference card, 26 keytop stickers, and a single sheet indicating the functions of the various keys on the NEC keyboard.

Multiplan

Multiplan is the spreadsheet program by Microsoft that some users swear by and others swear at. It has several improvements over the granddaddy of spreadsheets, *VisiCalc.* However, because of its extended features, many operations and entries require more keystrokes than *VisiCalc.*

On the other hand, on the bottom of the *Multiplan* screen is a short explanation of the various commands; this aids in learning and using the system. A HELP command, which brings in additional help information from the disk, is also available. One very unhelpful thing is that the CP/M labels for the function keys remain displayed on the bottom row of the screen; they are not implemented under *Multiplan* and cause an error if pressed.

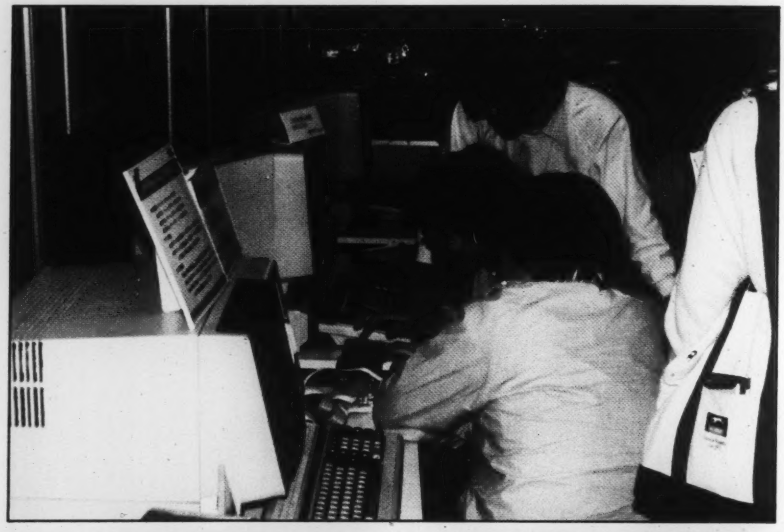
Like *WordStar, Multiplan* is a favorite spreadsheet of hard core programmers because of its extended capabilities; however, it is more than satisfactory for the occasional user as well.

Communications

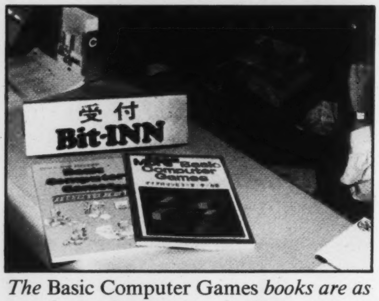
The PC-8800 system includes a powerful terminal program built into the ROM. Since the system includes a standard RS-232 serial interface, with the addition of a cable and modem, the PC-8800 is ready to do duty as a communications terminal.

Terminal mode can be entered in two ways. From Basic, the TERM statement allows the selection of communications parameters. Once entered, the computer automatically acts as a terminal.

If you expect to use the computer mainly as a terminal, the DIP switches on the back can be set to enter terminal mode automatically upon powering up the system.



The Bit-INN in the Akihabara area of Tokyo is popular with young people.



The Basic Computer Games *books are as popular in Japan as in the U.S.*

In either terminal mode, function keys 6-10 are redefined to allow the entry of control codes, select half or full duplex, dump the screen to the printer, and copy data from the buffer. The manual describes the use of terminal mode thoroughly including remote Basic protocol.

Other CPU And Peripherals

In addition to the system components described above, eight expansion boards are available for the computer. Perhaps the most interesting board is one containing a 16-bit 8086 microprocessor. Presumably, with this board the 8800 would be able to run IBM PC software as well as many of the emerging 16-bit packages. Details were not available about this board at the time of writing this review.

Two memory boards are available, one with 32K and the other with 128K in four banks of 32K each.

A serial communication board has two serial ports for different types of synchronous (bisync/SDLC/HDLC) and asynchronous protocols. This board will allow communication with IBM and other mainframes.

A voice synthesis and voice recognition board each contain their own cpu, memory, and special chip set for speech synthesis or recognition.

Last, for engineers and designers, a universal board, which can contain up to 32 wirewrap IC sockets, is available.

Pricing

The PC-8800 bundled package includes the computer with 64K, dual 5¼" disk drives, monochrome monitor, both Basics, CP/M, *WordStar,* and *Multiplan.* The package price is $2497, roughly $1000 less than the individual items purchased separately.

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NEC PC-8800, continued...

The high-resolution RGB color monitors are somewhat pricey; the 14" one costs $998 and the 12" one, $798. The 12" monochrome monitor with the bundled system is $199 by itself; a less expensive unit is available for $149.

The PC-6082A data recorder costs $100. The bundled 5¼" dual floppy disk drive costs $1099 separately while an 8" dual drive costs $1999.

The 16-bit 8086 mpu board costs $550 and a 32K RAM board costs $250.

Most of the above items are generally not discounted. One that is is the NEC PC-8023A-C printer. List price is $645, but it is frequently available in the low $500 range.

Although the bundled system at $2497 is an excellent value, if one were to add a color monitor and printer, the price would jump to around $4000—still a relative bargain. The 16-bit mpu and more memory would bring the price to over $5000, still generally in line with other systems with the same or less capabilities.

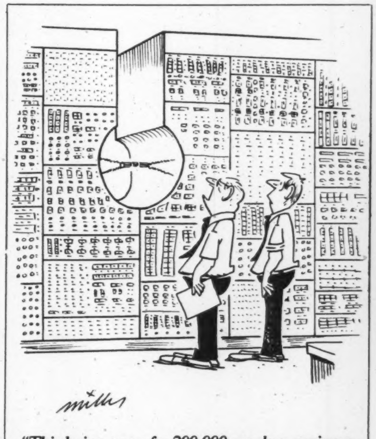
Trying out a NEC picturephone.

The Bottom Line

As is probably obvious by now, we are most enthusiastic about the NEC PC-8800 system. It has exceptional color graphics capabilities, an outstanding version of Basic, and a nice complement of included software. The computer has been available in Japan so the bugs are ironed out, and the system should have high reliability. It is an excellent value at the package price of $2497.

At the moment, there is not a great deal of packaged software for the PC-8800 system (unless you can read Japanese). Although there is a wealth of software that runs under CP/M, it must be recorded onto NEC disks and configured to use the NEC hardware. This can be done by downloading with the terminal package, but at the moment it must be done by you, the customer, assuming you want any packages beyond the included Basic, *WordStar,* and *Multiplan.* We have been assured by NEC that a great deal of additional software will be available before long, and we have no reason to doubt them.

As for us, we'll take the system as is; at the price it is a remarkable performer. □



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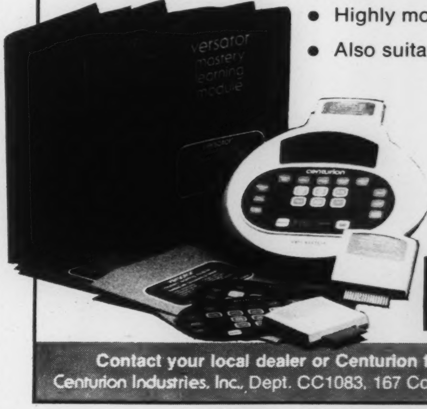

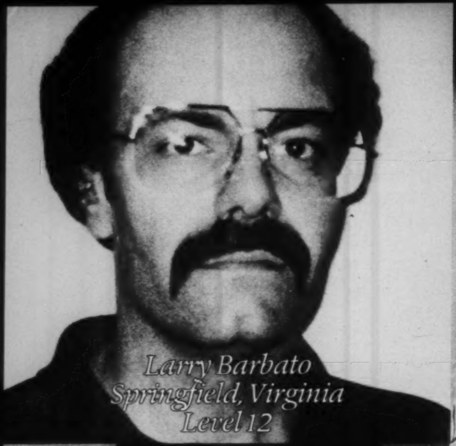

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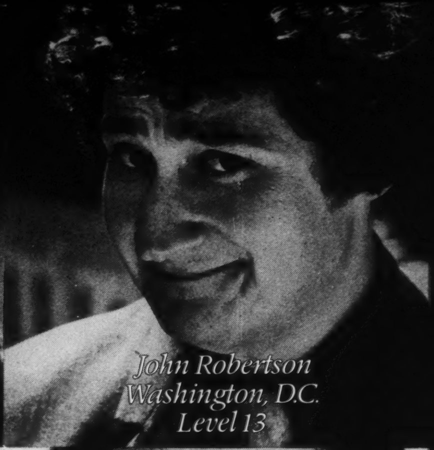

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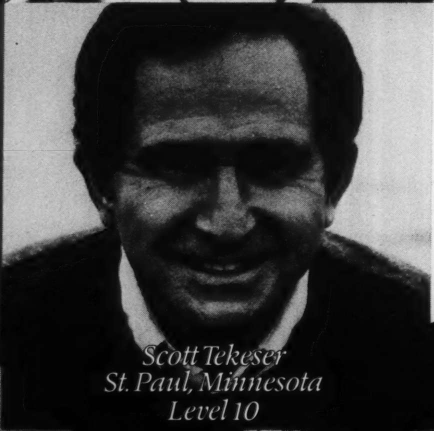

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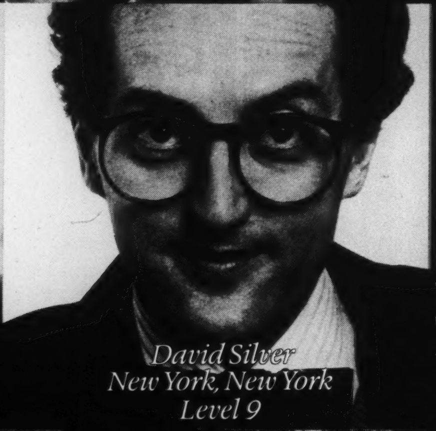

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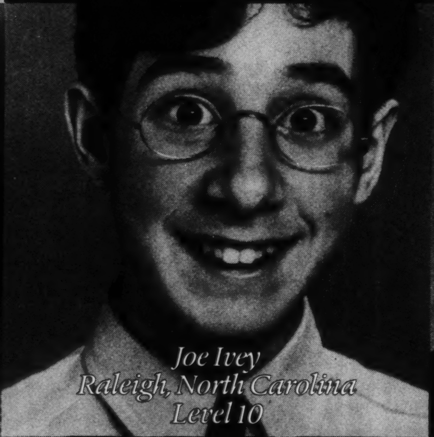

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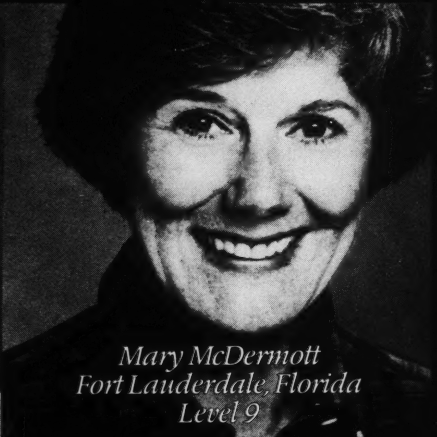

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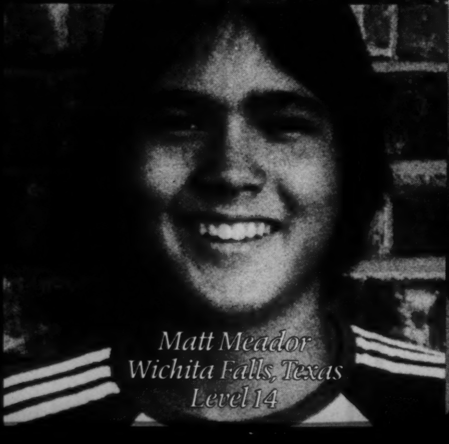

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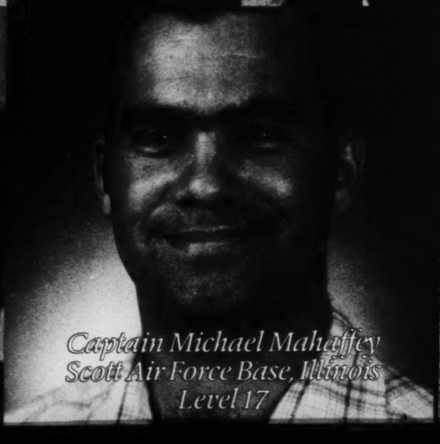

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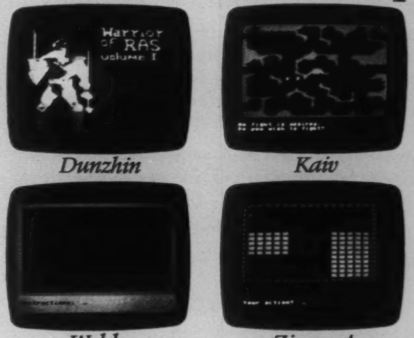

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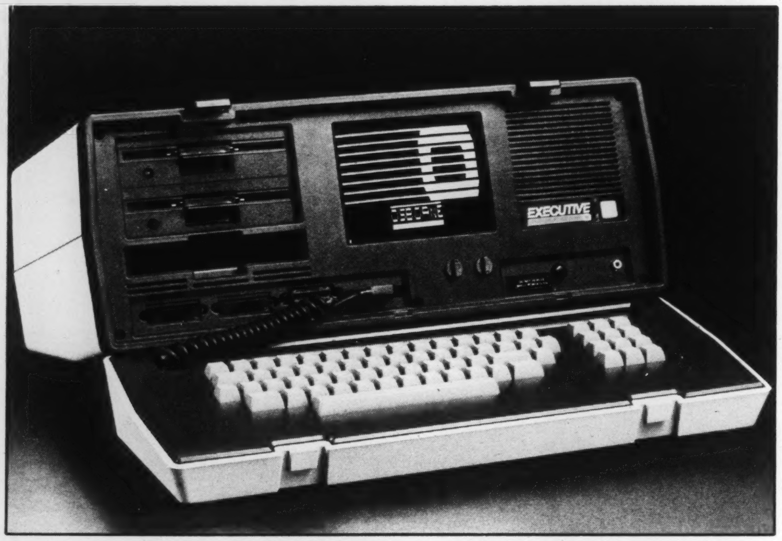
Executive Sweet

As this magazine goes to print, Osborne Computer Corp. is in serious financial difficulty. By the time you read this they will either be bankrupt or have been acquired. Nevertheless, many Osborne Executive machines were manufactured and are in the pipeline. We felt the machine was a good value at $2495; at possible distress prices, it could be a real bargain.

Stephen Arrants



Osborne has made some intelligent changes from the Osborne 1.

In 1980 Adam Osborne started an avalanche in personal computing with the introduction of the Osborne 1 Portable computer. The sewing-machine-like case opened up to reveal a self-contained computer with a small, monochrome display, two disk drives, and 64K of memory. Also included in the package was enough software to get the user up and running. *WordStar, MailMerge, SuperCalc,* CP/M, and utilities that cost almost as much as the computer were thrown in for free.

Imitators soon followed. Kaypro, Compaq, and other manufacturers began bundling portable computers with software for sale to a lucrative and previously overlooked market. In an effort to keep and expand its market share, Osborne has introduced a new generation of portable computers.

The new line is the Osborne Executive series. The result is a better computer, added features, more intelligent design, and improved software and documentation. As with the Osborne 1, there are no real technological breakthroughs. But the Executive does offer a refinement of existing ideas and technology.

creative computing

HARDWARE PROFILE

Product: Osborne Executive

Type: Portable Computer

System: Z80A, CP/M+

Specifications: 20.5" × 9" × 13", 28.5 lbs., CP/M+, MBasic, CBasic, *Word Star, MailMerge, SuperCalc, Personal Pearl,* and the UCSD p-system included.

Performance: Very good

Ease of Use: First time users had no problem.

Documentation: Excellent

Price: $2495

Summary: Good choice if the software fits your needs.

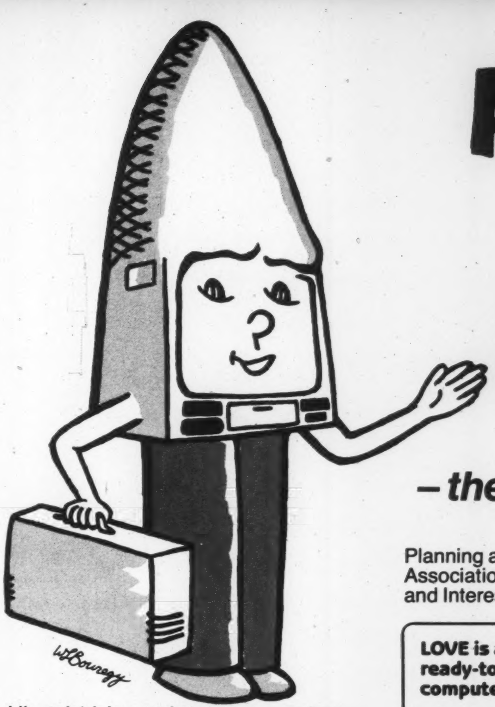
Manufacturer:
Osborne Computer Corp.
26538 Danti Ct.
Hayward, CA 94545

Specifications

As with the Osborne 1, a Z80 microprocessor is standard, allowing access to the large library of CP/M software. 124K of RAM is included. Additional RAM includes 4K for two 128-character sets, 4K × 12 bit RAM for video memory, and 2K for scratchpad RAM. 8K of ROM is present.

The most noticeable improvements are a 7" amber display, which is easier on the eyes than the old 5" black and white screen, and two double density disk drives with 185K capacity each. The drives are now placed to the left of the video display. Two RS-232 serial ports, an IEEE 488 parallel port, an external video connector, and a composite video connector are located on the front panel. The power switch has been moved to the front, just under the screen. A fan on top of the case is another welcome addition.

The detached keyboard has 69 keys and a 12-key numeric keypad. Unfortunately, the keyboard feel hasn't been changed from that of the Osborne 1. It still offers plenty of key bounce and an



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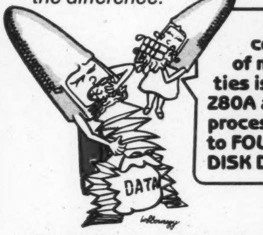
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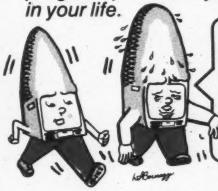
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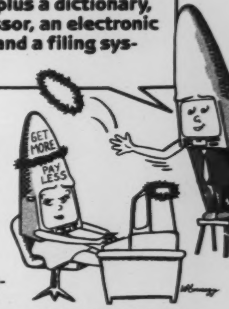
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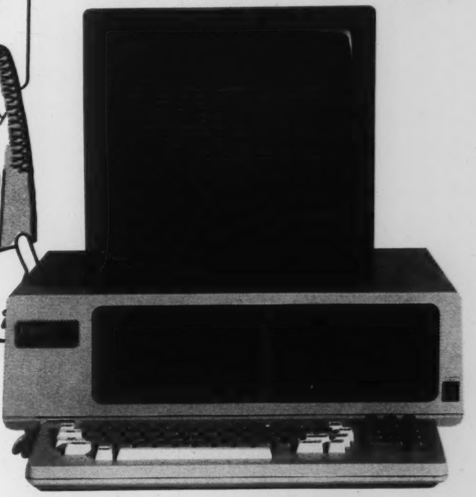

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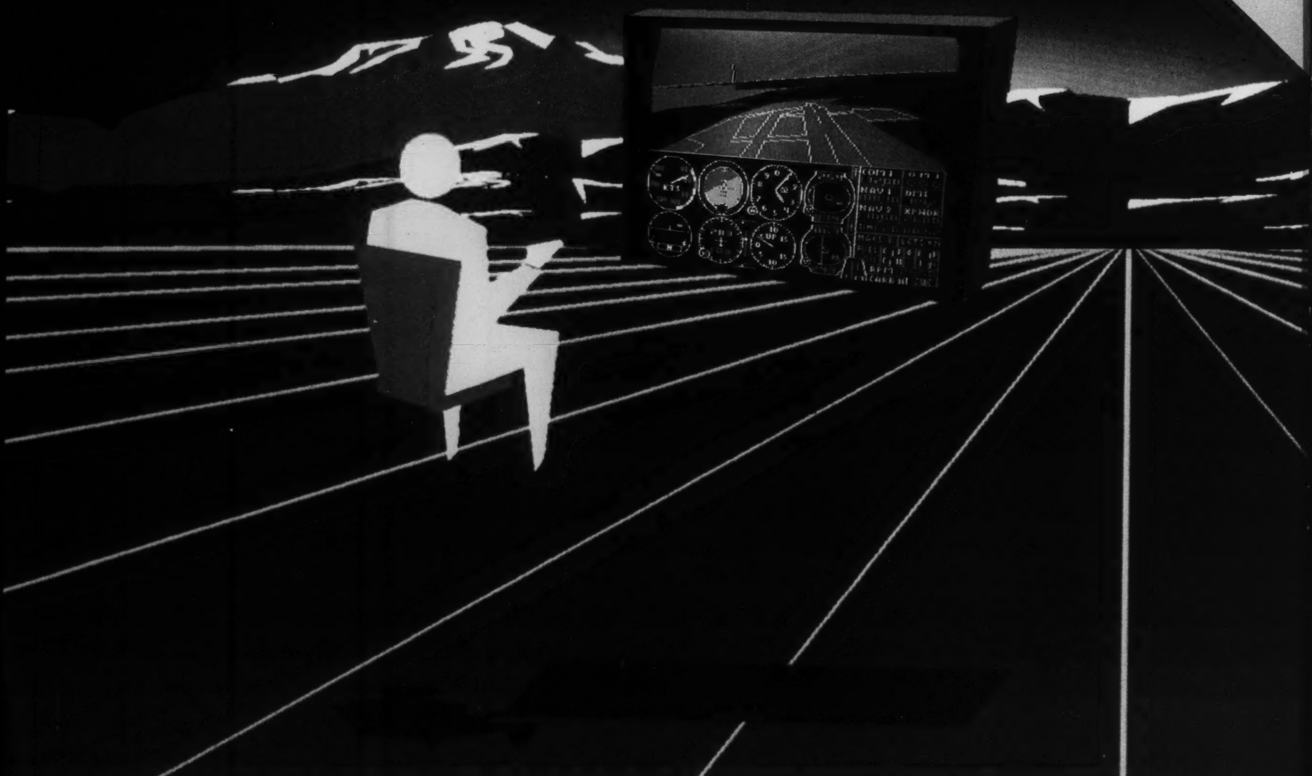

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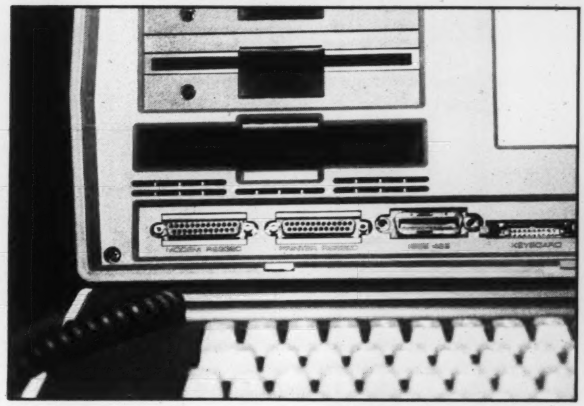


Smaller drives with more power. Third slot is for peripherals or disk storage.

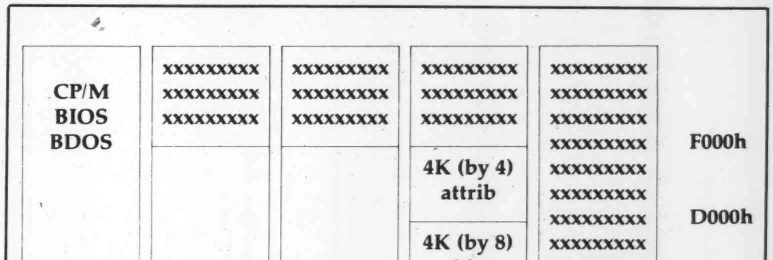
The power switch is on the front this time. Easier external video connections are now possible with the Exec.

odd feeling. I would have predicted that the keyboard would have been the first thing that Osborne would change.

Memory is bank-switched. A bank is simply a range of addresses in memory. By organizing memory into banks, the CPU can address more memory than would otherwise be available. This is done by bringing in memory segments as needed and hiding parts not used. Banks can consist of RAM, ROM, or a combination.

Bank 0 consists of 64K of RAM reserved for system use. It also contains BIOS, a part of BDOS, and disk and interrupt buffers. The top 4K controls bank switching and data handling, and therefore is never shadowed by any other bank.

Figure 1. Osborne Executive Memory Map.


CP/M
BIOS
BDOS
reserved for system use
xxxxxxxxx
60K RAM (user area)
CP/M
60K RAM (user area)
4K (by 4) attrib
4K (by 8) video
6K unused
2K RAM
8K ROM
F000h
D000h
C000h
4000h
2800h
2000h
100h
RAM Bank 0
User RAM Bank 1
Expandable RAM Banks 2–6
Video Bank 7
ROM Bank 8
xxx = Address space is unused by bank, and another bank is seen here.

Bank 1 consists of 60K RAM and Page Zero, which contains critical system address pointers.

Banks 2 through 6 are not implemented, but are reserved for system expansion. With sufficient hardware and a different memory scheme, up to 32 user banks are available.

Bank 7 contains the video screen image. The lower area contains bits 0 through 7 of the video memory and an area reserved for the Monitor and the DMA port. The upper portion contains the attribute bits, which control display type (reverse or normal, full or half-intensity, underscore, and the alternate character set).

Bank 8 is 16K, and is organized differently depending on whether the CPU is reading or writing to it. For example, when the CPU performs a read, Bank 8 contains 8K of ROM in the lower portion and 2K, as temporary storage, above it. The remaining 6K is unused. When a write is performed, the bottom 4K is RAM, containing the two character sets. Above this is 4K of ROM which is unused address space. The top 6K is unused, but overlays memory along with the rest of the bank. A map of Osborne memory is shown in Figure 1.

Video Display

The new, 7" amber display is a big improvement over the 5" monitor on the Osborne 1. The display is now a readable 24 × 80. There is no need for left-right scrolling, with portions of the display off the screen. Full upper- and lowercase display is available in reverse video and half-intensity, along with 32 block graphic characters. The cursor may be invisible, a blinking block, a steady block, a blinking underline, or a steady underline. A key click may also be selected.

Osborne has done something interesting with the way display characters are generated. Normally, the characters are in ROM. On the Executive, the characters are entirely "soft." When you boot up the system, a standard character set is loaded in. You can, however, create and edit new characters to suit your needs. Characters specific to a certain profession or language can be created and stored on disk.

Two external video connectors are now available. One connects to a standard NTSC display. The other is the one familiar to owners of the Osborne 1. These extra connectors are helpful when you want a display larger than the 7″ offered. Actually, the new display is quite nice. Since it is, after all, right in front of you, eyestrain doesn't seem to be a problem.

Storage

Two built-in drives provide an increase in storage over the Osborne 1. The double density drives give you 185K of CP/M space each—almost double the storage of the Osborne 1. There is now sufficient storage space for almost all CP/M applications. There is one compartment for disk storage, but if the Osborne modem or RAM disk option is added, you lose it.

Interfacing With The World

The Osborne 1 is noted for its excellent interfacing provisions. It has a standard RS-232 port, software drivers, a modem port, and an IEEE 488 port. The improvements in the Executive are truly spectacular. For example, Osborne is going all out on communications. The Executive will be able to emulate different IBM terminals, as well as other types of terminals. More than 25 emulations are planned; you have only to install the emulation into the operating system driver by menu selection.

Let's say you are an auditor working in the field. You want to retrieve information from your client's mainframe or mini. Select the correct terminal emulation, and you can retrieve his data. This makes for a very powerful, flexible communications system.

A serial I/O port gives you a selection of 15 baud rates, all selected via the menu. The IEEE 488 port can connect you with a parallel printer, a teletype, and most scientific equipment. A modem port is also present.

Under the CP/M+ operating system, logical and physical devices are entirely separated and easily assigned. The default setup usually assigns different functions to each port; a utility included by Osborne allows you to reassign them. Multiple physical devices can be assigned to one logical device. All three I/O ports could be assigned as list devices and you could have three printers printing in parallel. You may not want to do that often; in fact, you may never want to do it, but it shows that Osborne has tried not to close any doors unnecessarily.

A strong selling point for the Executive is the amount of software that comes with the system.

Software

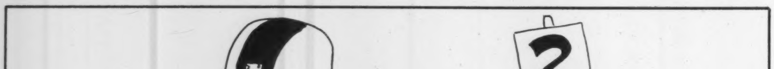
A strong selling point for the Executive is the amount of software that comes with the system. The CP/M+ operating system supplied offers all of the features of the earlier CP/M vers. 2.0 with a few modifications. MAC replaces ASM; SHOW and DIR include the older STAT functions, and SID replaced DDT. You should have no problems getting accustomed to this operating system.

One glaring omission is the lack of a Help screen. On the Osborne 1 the Help screen provided at least some help to first time users. Apparently, Osborne feels that users of the Executive know what they are doing.

The software consists of *WordStar,* one of the most difficult and time consuming word processors to learn; *MailMerge,* an associated mailing list program; and *SuperCalc*, an excellent spreadsheet program which some feel is superior to all others.

New software with the Executive includes the UCSD p-code and *Personal Pearl*, a database and information system. The addition of any type of database is welcome. Before you can use *Personal Pearl,* however, you must back it up on *ten* disks! I am certainly glad that they allow you to create backups, but performing this operation took a long time.

Personal Pearl is a serviceable program. It allows the creation of an address book, appointment calendar, forms, and information files. I can't figure out why Osborne included the p-code with the Executive. Although there is an excellent tutorial on its use, there are no suggestions as to what exactly an executive can do with it.



Documentation

The documentation supplied is both comprehensive and informative. Everything you need to know is included in the manuals. The manuals guide you all the way through setting up the system to creating your own *SuperCalc* worksheets. The tutorial style is easy to follow, especially for a system with the complexities of the Osborne Executive. The section on p-code is the most readable I have seen.

Summary

The Executive is a marked improvement over the Osborne 1. The redesign of the front panel, addition of a cooling fan, additional disk storage, extra memory, and the software configurable keyboard make this a comprehensive system. At 28.5 pounds, however, the Executive is a bit heavy to be called a portable.

If you are interested in a system purely for business use, the Executive and its bundled software may be just what you are looking for. Osborne has a good reputation for reliability and service, so I wouldn't worry about that. All in all, the Osborne Executive is a great machine. Now, if only I could play *Pharaoh's Curse* on it. ☐

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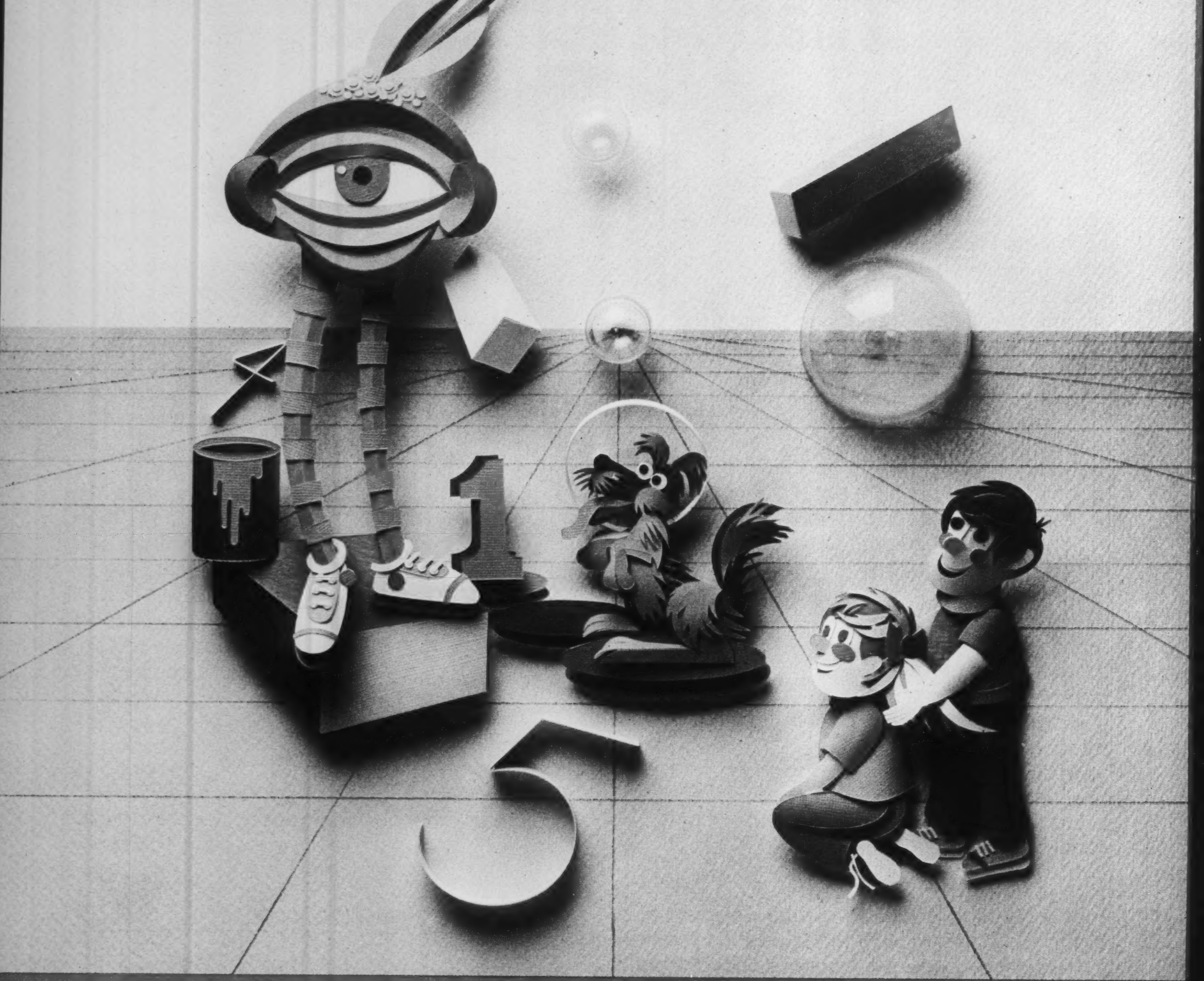

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Olympus C100 Microcassette Recorder

A Pocket Recorder For Your Pocket Computer

Glenn A. Hart

Hand-held and briefcase portable computers are wonderfully useful devices for the executive, converting otherwise wasted travel time into productive, fruitful worktime. A wide variety of miniature computers can meet almost any business, scientific, or engineering requirements.

One weakness of such devices has been their lack of permanent magnetic storage. While most such units feature low power consumption CMOS-type memory which retains its contents even when main power to the computer is off, obviously the amount of data which can be stored is limited to the size of RAM installed in the computer. Since most hand-helds don't have much RAM, the data storage is usually severely limited.

The quality of microcassette recorders, while adequate for voice dictation, is not up to the demands of data storage.

OLYMPUS
Pearlcorder C100

Even the exceptional unit with some form of archival storage, like the magnetic cards used in the Hewlett-Packard HP-75, doesn't hold much information.

The solution for some units has been the lowly audio cassette. Standard audio cassette recorders can often be used with an optional interface unit to store very large amounts of information, albeit at reasonably low speed. In the past, audio cassettes were sometimes unreliable, but newer designs have been proven to be dependable adjuncts to both hand-held and desktop computers.

One difficulty faced by the portable computerist is the physical size of most cassette recorders. An average AC recorder is often bigger than the small computer itself, and even portable cassette units are big enough to create a problem in the normal executive briefcase.

On the surface, the new microcassette recorders offer an interesting alternative. Already carried by many executives for dictation, it would seem that such recorders would solve the space problem, in terms of both the size of the recorder and the room taken by the cassettes themselves. Unfortunately, several obstacles arise. Most computer cassette interfaces require jacks for a

Glenn A. Hart, 51 Church Rd., Monsey, NY 10952.

creative computing

HARDWARE PROFILE

Product: Olympus C100

Type: Microcassette recorder

System: Any that uses a standard microcassette

Format: Microcassette

Specifications: Measures 5.4" x 2.6" x 1.1," operates on two standard 1.5 volt AA batteries or optional AC adapter. Two speeds, 15/16 ips and 1/2 ips.

Performance: Good

Ease of Use: Very good

Documentation: Adequate

Price: $122.50

Summary: Operates correctly with 300-baud cassette recording, may not work at higher speeds. Compact.

Overall Mark: Good

Manufacturer:

Olympus Optical Co.
4 Nevada Dr.
Lake Success, NY 11042
(516) 488-3880

microphone, an earphone, and a remote control jack to control tape movement, and no microcassette recorders have included these jacks. Also, the quality of microcassette recorders, while adequate for voice dictation, is not up to the demands of data storage.

Olympus Optical Co. of Japan, one of the leaders in microcassette technology, has addressed these problems with their new C100 microcassette recorder. In this compact and inexpensive unit, specifically designed for data storage, the limitations of all other microcassette units have been remedied.

External Features

At first glance, the C100 looks like any other pocket microcassette recorder. About average size for such units, the C100 measures 5.4" by 2.6" by 1.1" and operates on two standard 1.5 volt AA batteries or an optional AC adapter. Like many other current units, two speeds are available, the faster ($^{15}/_{16}$ inch per second) for data and highest voice quality and half speed ($^{1}/_{2}$ inch per second) for maximum recording time for a given tape length.

Other common features include a built-in condenser microphone, three-digit mechanical counter with reset button, battery condition LED, pause control, cue and review (audible fast forward and rewind for locating segments on the tape), and separate controls for stop/eject, play (also labeled LOAD), record (also labeled SAVE), fast forward, and rewind.

The features which set the C100 apart are the full set of jacks for remote, earphone, and microphone, a monitor switch which makes playback audible even if the earphone jack is inserted so data playback can be heard, a phase reversal switch which is used to adapt the recorder to the needs of various computer systems, and special construction which allows the fast forward and rewind to function even with the remote jack in, which is a real convenience in computer use.

Operation

Operating the recorder is simplicity itself. Everything works exactly as would be expected, with the computer controlling tape motion as it should. Recording level is fixed by an automatic gain control circuit, but playback volume can be adjusted to match the requirements of the computer. The correct setting for the phase switch must be determined by experimentation; the recorder simply won't work on one of the settings.

The monitor switch has no effect on the storage process, but can be a convenience if the computer doesn't have audio output of its own during saving or loading. A special circuit boosts recording level when battery power begins to ebb, ensuring correct recording even when the Battery Indicator LED shows that power is low.

Olympus offers a special microcassette tape optimized for data storage. Designated the MC-15CT, this cassette stores up to fifteen minutes total, which is a very convenient length for data use. It retails for $2.20 each.

I tested the C100 with three Radio Shack computers, the PC-1 and PC-2 hand-helds, and the Model 100 briefcase executive computer. The C100 batted two for three. Both hand-helds use conservative 300 baud cassette recording, and the C100 worked perfectly with them. Even long programs saved and loaded without any errors, time after time. I also tried the recorder with normal audio microcassettes, and these worked equally well.

The new Model 100, however, presented problems. Its 1500 baud cassette format speeds data transfer dramatically, but the more demanding format proved too much for the C100. I had major problems transferring even a five-line file, and it took ten or twenty tries before I had one successful transfer, even after trying all ten possible playback volume settings and both positions of the phase switch. Longer programs and text files were out of the question; occasionally the computer would recognize the file header from the tape, but the load would invariably abort somewhere in the file itself.

The C100 is ideal for owners of hand-helds like the PC-1 and PC-2 and their Sharp equivalents. The space saved is significant, and operation is essentially perfect. While it is too bad that the already large Model 100 can't benefit from the space saving, this computer is developing a reputation for fussy cassette operation, and many full size cassette recorders have problems with it as well. Thus it is not surprising to find that the C100 has difficulties with the Model 100, too.

Given that the C100 is priced at only $122.50 retail and also operates as a first-rate voice/dictation recorder, I strongly recommend it to portable computer owners. ☐

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Simons' Basic

Tim Onosko

As personal computers go, the Commodore 64 appears to be a commercial "hit." It is a reasonably powerful machine with plenty of memory and unique graphic and sound features. Its quick acceptance by consumers should not be a surprise, since it is a bargain. (In December, 1982, the 64 sold for $595 and there was almost no discounting of prices. As this is being written, it is generally available for around $225, but by the time you read this, it may be available for even less.)

According to the official company legend, Simons surveyed other Basics and their extensions and picked from among their features.

Shrewd pricing isn't the only trick Commodore has up its sleeve, however. It will soon unveil Simons' Basic, an extension to the resident language of the 64 which will add an unbelievable 114 commands to the machine.

Commodore Basic isn't a bad language. A version of Microsoft Basic, it has very few peculiarities and no major bugs. Its only real problem is that it didn't grow up with the company's computers. While it was serviceable for the original 8K Pet, which had no color, sound, or high-resolution graphics, Commodore Basic just isn't enough for the 64, which has all of those features.

In fact, the complaint about the 64 has often been that its power is difficult to unlock from Basic, and novice users are shut out completely by the complexity of the task. The Apple computers at least have a few screen commands in their Basic, and the Atari computers have even more. Programming even the most rudimentary graphics and sounds on the 64 is an endless job of PEEKing and POKEing.

creative computing
SOFTWARE PROFILE

Name: Simons' Basic

Author: David Simons

Type: Basic Language Extension

System: Commodore 64

Format: Disk

Summary: Essential programming tool for the Commodore 64 includes 114 new commands for graphics, sound, programming, and editing.

Price: $29.95

Manufacturer:
Commodore Business Machines
1200 Wilson Dr.
Westchester, PA 19380

Simons' Basic offers not only a solution to the problem but almost makes the 64 into an entirely new computer. (Probably the one it should have been in the first place.) The 114 new commands are so comprehensive that they make Simons' Basic more than a *good* language extension. It may be one of the very best ever designed. I predict that it will cement the popularity of the 64 and become *the standard language* for programming the machine.

Background

The origin of Simons' Basic is interesting in itself. It was created by a British programmer named David Simons, whose parents gave him his first computer just three years ago on his thirteenth birthday. (Commodore's founder and president, Jack Tramiel, should adopt the kid and make him heir to the company fortune, or at least pay him enough to keep him writing for his computers for life.) According to the of-

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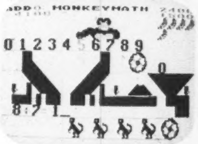

Monkeymath
by Dennis Zander

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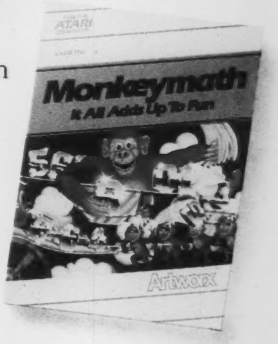

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by William B. Sanders

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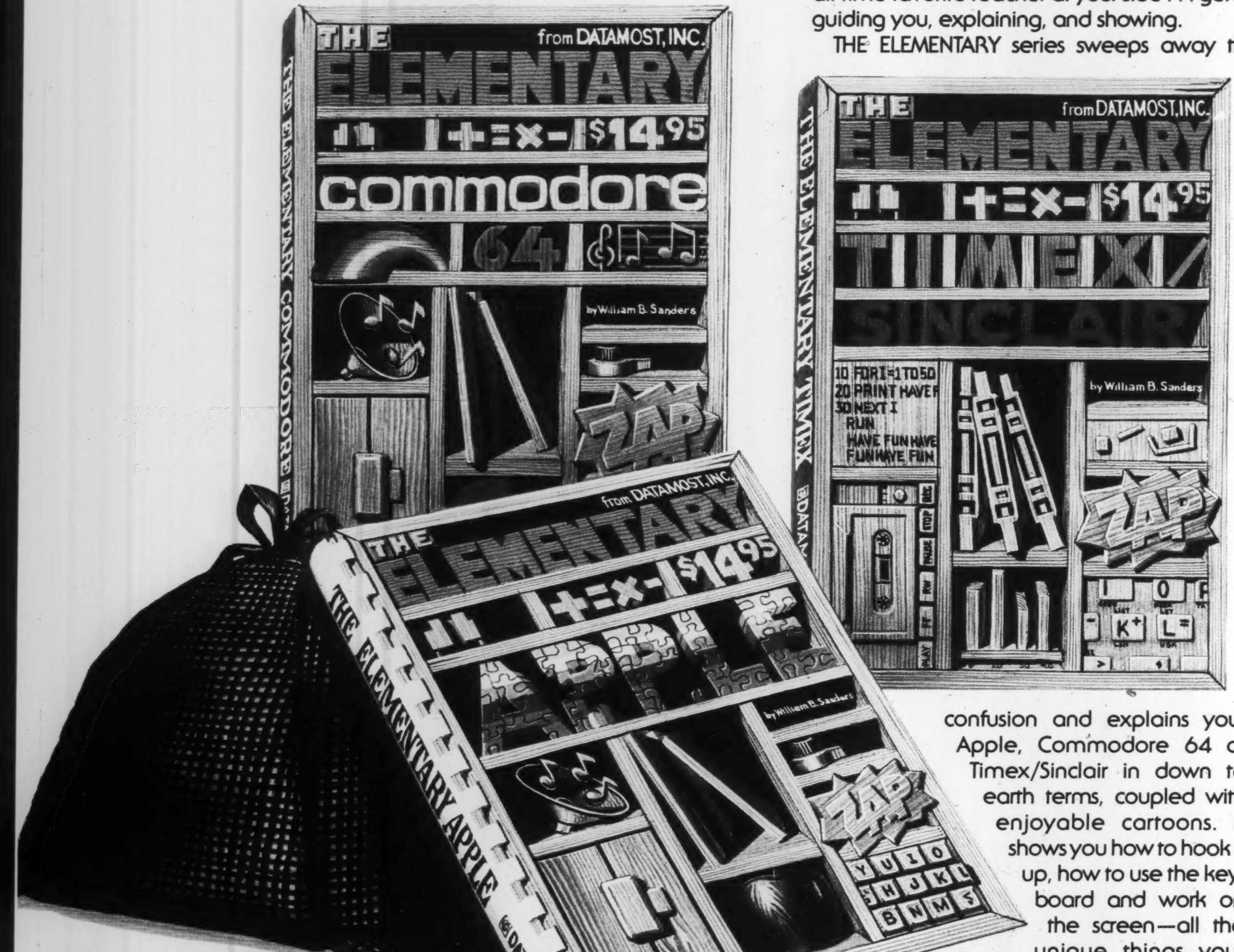
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ficial company legend, Simons surveyed other Basics and their extensions and picked from among their features. That is probably true. Simons' Basic resembles other recent extended Basics such as BasicA for the IBM PC.

Simons' Basic is packaged as a ROM cartridge, and should be available by the time you read this. At press time, no price was announced by Commodore, as the program had not yet gone on sale either in the United Kingdom or in the U.S. In the U.K., however, a price of £50—or about $75—has been announced.

Okay, so what's so good about Simons' Basic? That requires more than just a few sentences. The new commands are grouped into several categories: Programming aids ("toolkit" commands and other conveniences); new Basic words for inputting information; arithmetic and math extensions; disk functions; high-resolution graphics; screen manipulation; sprite graphics words; error trapping schemes; music notation; and commands that read controllers (light pens, joysticks, paddles, etc.). Finally, another set of new words is used for structural programming, and can make this Basic very Fortran-like, if you choose to use them. (And I bet you will.)

Obviously, there isn't enough space to describe all 114 commands. (How does all that stuff fit?) Here is a a rundown of each category and the highlights of Simons' Basic:

Programming Aids

Though the classic "toolkit" functions, like AUTO (for automatic line numbering), RENUMBER (for renumbering lines) and FIND (for searching for commands and strings) are here, some of the most impressive commands are not just debugging aids. PAUSE, for example, pauses a program for a length of time you specify. If you press the RETURN key before the time is up, the program will continue. It is very handy. CGOTO lets you GOTO the number of a line calculated by the computer. KEY assigns commands or other words or keystrokes to the function keys of the 64, and is used for single-key entry. DISAPA and SECURE are used to hide permanently program lines you want to keep from prying eyes. OLD reverses a NEW command.

"...The computer is down so we've lost our outside eye. However, we are tracking a large asteroid!"

My only complaint with any of these was RENUMBER, which does not renumber GOTO and GOSUB statements. The book says you won't need them because you will be using "structured" program style (more on this later). I disagree, and found that I immediately

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wanted to renumber old programs written in original Basic.

Input Handling and Text Manipulation

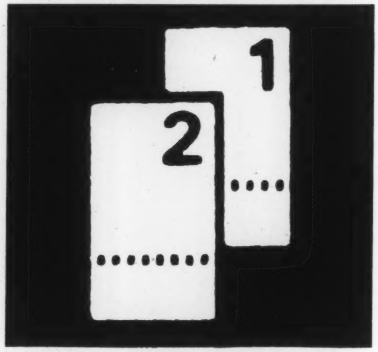
Hardcore programmers will go crazy over new input routines. I admire the work here, but was fairly happy with INPUT and GET and not much bothered by their limitations. Nonetheless, FETCH is a major improvement which sets limits to the length and type of information expected by the program. ONKEY gives new meaning to the function keys and replaces dozens of lines of Basic code. New string handling words include INSERT, INST, PLACE, and DUP, which allow far finer dissection of strings than I have ever seen. Three great screen commands are PRINT AT, which eliminates moving the cursor around with loops or multiple PRINT statements, CENTRE (British, remember?) which prints text centered on a line, and USE, a form of PRINT USING.

Hardcore programmers will go crazy over new input routines.

The new string commands open many, many possibilities unavailable in Basic, and lend themselves to the kind of natural language processing that Basic programmers have only dreamed of. As for the screen commands, PRINT AT, USE, and CENTRE, these come as a relief to anyone who has ever wasted time trying to simulate them.

Numeric Aids

MOD returns the remainder when one whole number is divided by another; DIV returns the whole number (integer) and drops the fractional part. FRAC gives you the fractional part of any number, in decimal form. EXOR performs that logical operation known to mathematicians as an "exclusive or." The commands that most programmers may end up using most are those that do automatic conversion among binary, decimal, and hexadecimal numbers.



If you are involved in understanding the machine on its own level, you know that hexadecimal numbers are vital to programming machine code. Some people pick up on hex and binary numbers quickly and easily. I didn't, so I found these commands a relief.

Disk Commands

There are only two of these, DIR, which gives you a disk directory (lots of options here) and DISK, which allows you to perform most other disk operations without the OPEN, PRINT#, and CLOSE statements required by Commodore Basic.

These almost replace the Wedge (DOS Support) program familiar to anyone who has used any of Commodore's disk systems. *Almost,* that is, except that you can't easily read the disk drive error channel to find the exact nature of a file-handling mistake. Will this cause big

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problems? I don't think so. It is unfortunate, though, that you can't yet use Commodore's Wedge in conjunction with Simons' Basic. (Wedge will have to be rewritten.)

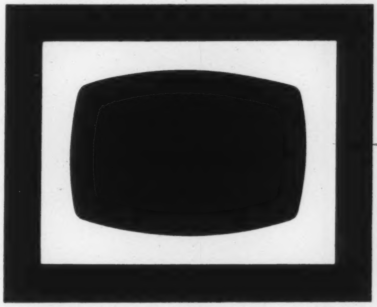
Graphics

Here, as expected, is where Simons' Basic really shines. It gives you instant access to high-resolution (320 by 200 pixels) and multicolor (160 by 200) graphic modes. These let you draw defined shapes—REC, for rectangle, CIRCLE, ARC—with a little bit of thought and almost no effort. PAINT fills the shapes with a color. You can also PLOT dots and DRAW lines, of course, and mix TEXT (another command) of several different sizes with the graphics.

These are the commands that will instantly sell Simons' Basic. One line containing any of the eighteen commands eliminates dozens of lines of Basic.

Screen Manipulation

The commands in this category are "extras." None is terribly vital, but each so easy to use that they will be favorites for adding those "bells and whistles" to programs. There are several variations on FLASH, which flashes alternate colors of the screen border, background, and characters. SCRSV lets you save screen text and designs as disk or tape files; scroll commands move areas of the screen in up to four different directions simultaneously. COPY dumps a high-resolution screen to a dot matrix printer. HRDCPY, for hardcopy, does a similar thing for screens of text.



There are some who may argue over the necessity of these commands—there is a total of fifteen—but that's not the point. This is meant to be an *enhancement,* remember?

Sprite and Character Graphics

Sprites are small pictures that the 64 can move around the screen. They are defined as a one-color block of pixels 24 dots wide by 21 dots high. Multicolor versions of sprites are four-colors (including the background color), but half the horizontal resolution. In addition, the 64 lets you use a "soft" character set that can be redefined for foreign language characters, special symbols, graphics, etc. Eight new Basic commands (and variations) let you define and move sprites around the screen and redefine the characters.

This is just one approach to the problem of simplifying these kinds of graphics. I am not so sure that the way it is done in Simons' Basic is the best way, but it is the best I have seen.

Music and Sound

Like the sprite commands, new music words offer the best solution yet of how to "talk" to the 64 synthesizer chip, called SID (for Sound Interface Device). VOL sets the overall volume of sound; WAVE assigns each of three voices a waveform, selecting from sawtooth, pulse/square wave, and triangular waveforms, noise and ring modulation. ENVELOPE lets you "shape" the sound. With MUSIC (another command), you can easily enter musical notes and build song tables. PLAY, which actually produces the sound, has two modes. In the first, the program pauses while music or a sound effect is playing. In the second, the sounds play while the program runs.

Frankly, without commands like these, there is no hope for the Basic programmer who wants to create music easily on the 64. These commands will still take work to understand and use properly, but they are quite good.

Structured Programming

Here is where the real power of Simons' Basic lies, though I am not sure how many first-time programmers will use these new commands. With PROC, you can define and name a procedure, which is kind of a substitute for the traditional Basic subroutine. The name is used to identify the first line of the procedure, and END PROC is used on the last line. This may sound like a frill, but it isn't. The advantages of using this kind of organization in a program will become apparent to you. For one thing, there are no more GOSUB line numbers to memorize and mess with. One reason RENUMBER doesn't work on GOSUBs and GOTOs is to encourage you to use procedures.

Simons' Basic stands an excellent chance of becoming the standard Basic for Commodore 64 programs.

Veteran Basic programmers may take a little while getting accustomed to this, but the effort is worth it. First-time users should learn to program in this style immediately. It actually makes Basic readable and workable. Structured programming commands also enhance loops, with IF . . . THEN . . . ELSE, REPEAT . . . UNTIL, LOOP . . . EXIT, IF . . . END LOOP, and with words that limit the values of variables to specific areas within a program. Lastly, ON ERROR is designed to improve error trapping. It allows a program to continue running, even though one of many different errors might normally occur. The program simply branches to a section where the error can be studied and corrected.

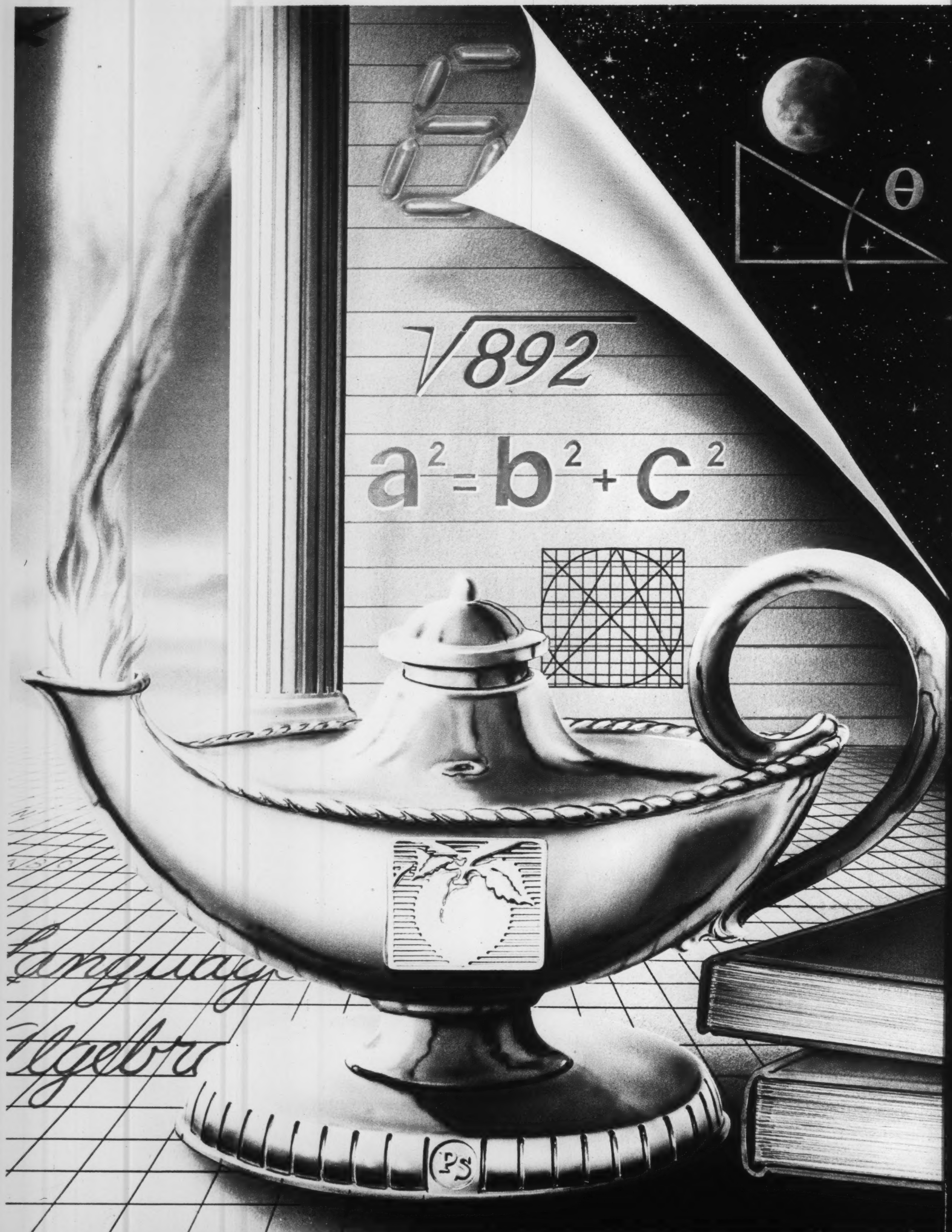
Summary

In my opinion, Simons' Basic stands an excellent chance of becoming the standard Basic for Commodore 64 programs. This can be argued. For example, a Basic expansion has been available for the little Vic-20 almost from the start, but it never really caught on. Very few (if any) published programs take advantage of the Super Expander cartridge that includes new color, graphic and sound commands.

Still, BasicA (Advanced Basic) has become the official Basic of the IBM PC, and no user of that machine would be without its excellent capabilities.

A final word about the Simons' Basic package. A note of thanks should be given to Commodore's U.K. division for assembling a very fine manual. It is thorough but concise, and all of the examples I entered from the book actually worked! (If you have ever worked with a Commodore manual, you know what a joy it is to say this.)

I think many, many people are going to enjoy Simons' Basic, and an equal number are going to flabbergasted by its power. Commodore had better be planning to manufacture lots of copies because they will go fast. □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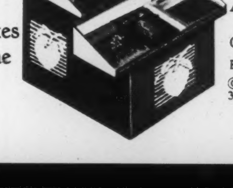

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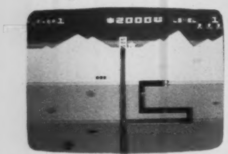

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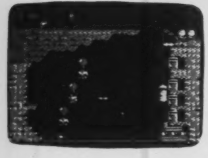

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CIRCLE 150 ON READER SERVICE CARD

Lisp for the Atari

Ken Litkowski

Datasoft has generally selected well in deciding what functions to incorporate in its implementation of Lisp. If you are familiar with Lisp and wish to invest a significant amount of money, what follows is essential to knowing what to expect. The manual assumes knowledge of Lisp, but Datasoft provides a textbook (*Lisp*, by P.H. Winston and B.K.P. Horn, Addison-Wesley Publishing Co., Reading MA, 1981), for those who want to learn.

> **The elementary functions seem to have been implemented exactly as required by any dialect of Lisp.**

Be forewarned that you will spend a great deal of time in learning, since this is a language unlike anything else you have experienced.

General Comments

There are two principal dialects of Lisp, Maclisp, and Interlisp. The manual claims that Atari Interlisp is a subset of standard Interlisp. Except for the use of DEFINEQ instead of DEFUN to define functions, you will not even notice. So little is implemented that the differences between the two dialects are of little consequence. Since the textbook uses Maclisp, a Maclisp emulator was included on the disk to enable you to work the exercises. However, several of the functions in the emulator are flawed, so you may have trouble obtaining the results in the textbook.

An entire programming environment for Lisp may use 150K; in this implementation, only 32K is used, leaving 16K for user programs. This is a significant limitation, although you should remember that, since data and programs are represented in the same way, programs can be stored on disk and called in as data and executed. This is the only way to proceed, given the memory limitations of the package. It requires a great deal of ingenuity, so you must be prepared to cope with the movement of data and programs between memory and disk to make effective use of the system. Relatively few functions have been implemented here. Thus, the full power of Lisp will not be immediately available to the user. However, since all Lisp functions can be written in Lisp, any needed function can be created.

Mathematical Functions

Atari Interlisp, like Atari Basic, does not distinguish between fixed and floating point numbers. Only the following arithmetic functions are implemented: + (equivalent to the usual PLUS, except that only two arguments are permitted), * (TIMES, again only two arguments), /(QUOTIENT), SUB (DIFFERENCE), EXP, LOG, and INT. The following standard Lisp functions are not implemented: ABS, ADD1, EXPT, FIX, FLOAT, MAX, MIN, MINUS, REMAINDER, SORT, and SUB1.

List Processing Functions

For the most part, the elementary functions seem to have been implemented exactly as required by any dialect of Lisp. This is essential, since it is from these functions that everything else grows. The following functions have been implemented: SET, SETQ, QUOTE (including '), EVAL, CAR, CDR, CONS, LIST, APPEND, LENGTH, and LAST. The dotted pair notation is supported (and is effectively used in disk operations). Composite CARs and CDRs are not implemented, but similar functions are easily created.

The more sophisticated list processing functions do not receive quite the same treatment and can pose some problems. Atari Interlisp has the basic "surgical" functions RPLACA and RPLACD, but lacks DELETE, NCONC, SUBST, PUTPROP (or PUT), GET, REMPROP, and REVERSE. These latter funcions are provided in the Maclisp emulator, but are not implemented there with care. PUTPROP and NCONC will not operate in the ways expected, so they must be modified by the user to obtain the expected effect. (I modified PUTPROP, REMPROP, and GET so they would create and operate on association lists; thus, it was useful that

creative computing

SOFTWARE PROFILE

Name: Interlisp

Type: Language

System: 48K Atari 800 with disk drive.

Format: Disk

Summary: A reasonable implementation of a subset of the standard Interlisp dialect of Lisp.

Price: $149.95

Manufacturer:
Datasoft Inc.
19519 Business Center Dr.
Northridge, CA 91324

Ken Litkowski, 392-004 North Summit Ave., Gaithersburg, MD 20877.

they were not system functions.)

Atari Interlisp supports ASSOC, but not the STORE and ARRAY functions. However, it does provide a function @ which returns the nth CDR of a list—a useful function for array-like processing. In addition, the functions UNPACK and PACK are provided for exploding and concatenating atoms. However, PACK ignores numbers and eliminates them from a concatenation.

Predicate Functions

Atari Interlisp contains several predicate functions, but falls quite short of providing the variety that might be found in standard implementations. The following functions are implemented: # (equivalent to NUMBERP), >(GREATERP), EQ, ATOM, MEMBER, AND, and OR. Curiously, and somewhat disconcertingly, MEMBER does not operate on lists of numbers, so you cannot determine, for example, whether 10 is a member of the set (4 10 12).

Some relatively standard functions that are not supported include BOUNDP, EQUAL, LESSP, MINUSP, NOT, NULL, and ZEROP. A version of EQUAL is provided in several of the sample programs. NOT and NULL are equivalent to (EQ X), where the function determines whether X is equal to NIL.

Function-Writing Functions

The elements necessary to write new functions (COND, PROG, GO, RETURN, and PROGN), all of which seem to be implemented in their expected form are provided. To write new functions, the Interlisp forms of DEFINEQ and DEFINE are used, instead of the DEFUN of Maclisp. Atari Interlisp supports LAMBDA, NLAMBDA, and MACRO expressions (equivalent to the EXPR, FEXPR, and MACRO forms of Maclisp). The supplied Maclisp emulator makes it possible to use DEFUN forms, except that only one expression is allowed in the body of the function definition.

Using DEFINEQ to write new functions should pose no cenceptual difficulties. However, writing such functions does present some practical problems. On the Atari, the length of a function is limited to one logical line—120 characters. To get around this, you can define a function in steps, pressing the RETURN key before entering the final right parenthesis of the definition. The system will thus digest what it has been given and await the entry of further information. Once a definition has been entered in this form, however, it is virtually impossible to alter it. You can retrieve the function definition using GETD, but you cannot modify it by changing an errant portion of the function. The function must be entered from the beginning.

Fortunately, an editing package is provided as one of the sample programs. This package is more than a sample; rather, it is essential for using this system. Although the editing package does not contain all the sophistication that might be found in a major installation, it provides 24 commands, which are quite adequate.

The manual gives some detailed examples of how to use the editor, but does not sufficiently emphasize its importance. The editor takes up some 7K of the 16K available to the user. As a result, you must usually create functions, store them on disk, erase all user-defined functions, reenter the stored functions (without the editor), and then execute them.

Functions with Function Arguments

In addition to the EVAL function, Atari Interlisp implements the APPLY* function. However, none of the composite mapping functions are implemented. MAPCAR and FUNCALL are provided in the Maclisp emulator, but they are designed to take only one set of arguments. This somewhat defeats the purpose of such functions.

> ***The greatest deficiency of Atari Interlisp is the absence of any capability for examining or altering what the system is doing.***

Input and Output Functions

Atari Interlisp provides a sufficient number of read and print functions (READ, READA, READC, PRINT, PRIN1, PRIN2, TERPRI) to provide you with whatever you need. These functions might differ slightly from what you are accustomed to, but the differences should pose no problem. Several additional functions are implemented to account for the peculiarities of the Atari. These include LOAD, SAVE, OPEN, CLOSE, IN#, PR#, POINT, and NOTE. Each of these functions is supposed to operate like its counterpart in Atari Basic, but such is not quite the case. The manual poorly documents these functions and the differences, leading to some aggravation. For example, I found that I could not save a list directly; instead, I had to create another list containing the name of the list I wanted to save and then save the top list.

Error Handling Procedures

Only a few error types are recognized by the system, for example, encountering an undefined function or an atomic expression when a list is expected. When such errors do occur, control is passed to an error handler, which first displays the error type and the expression which caused the error. Once in the error handler, there are four options: 1) exit from the error handler, thus aborting the current evaluation thread; 2) perform any function which would normally be available (including examining the values of any variables in the current evaluation thread); 3) examine, using the function BAKTRACE, the sequence of evaluation which led to the error; 4) continue the evaluation thread by providing a value for the expression which caused the error. A problem occurs in using BAKTRACE when the sequence of functions leading to the error is longer than can be displayed; the evaluation thread nearest the error condition is lost from view, so the benefits of BAKTRACE are lost.

Atari Interlisp provides only one debugging function (BREAK), which prints a message and then passes control to the error handler. An ongoing evaluation can be halted by pressing the control key and the letter B; doing so also passes control to the error handler. No other tracing or step function is provided.

System Functions

To me, the greatest deficiency of Atari Interlisp is the absence of any capability for examining or altering what the system is doing. Some insignificant functions are provided, but these are not sufficient. OBLIST lists all currently defined (system and user) atoms (including functions). NEW reinitializes the system by deleting all user-defined expressions; this cannot be done selectively. MEM returns the number of unused bytes of memory and is the means by which a garbage collection is forced.

PEEK and POKE enable you to examine and to change the contents of any memory location. However, you are not told what is in memory, except for a very few specific locations. Neither are you told what part of Atari's OS and DOS variables are retained, nor are you given a decent memory map. Further, no provision has been made for calling or constructing machine language subroutines.

Memory allocations are made once and for all, so it is not possible to optimize the use of an already limited memory. Even the information necessary for optimization, e.g., detailed

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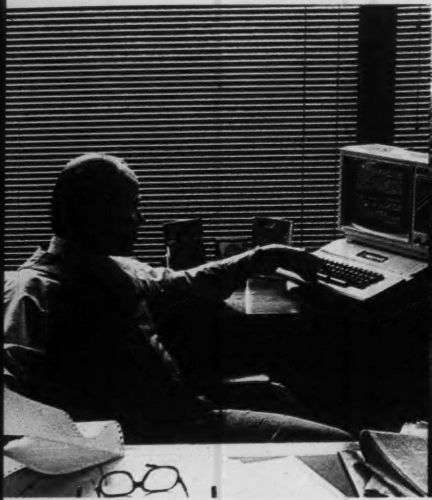
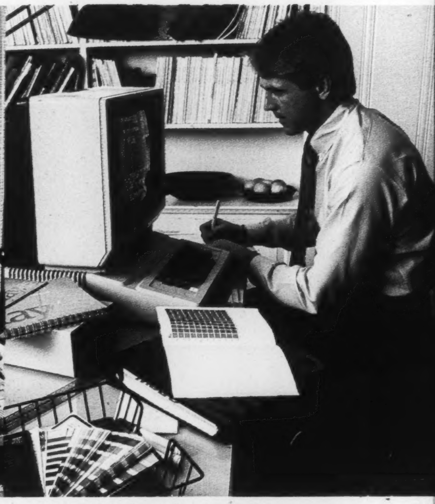
Hayes

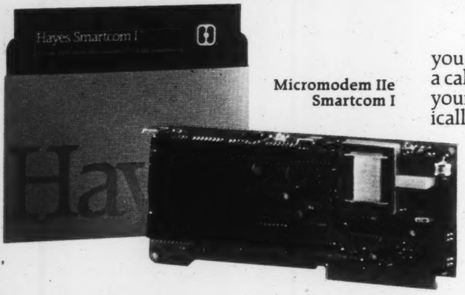


"Thanks for the prompt reply. Sure was a lot faster than waiting for the mail!"

"Gary: The pedigrees for next week's auction are as follows..."



"Attn. Prod., Sales, Purch.: Recommend 50% blue, 30% red screen for closest match."



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Lisp, continued...

memory maps, how the system makes assignments, and how memory is being used, is not provided.

Atari-Specific Functions

Finally, Atari Interlisp implements functions which pertain to the specific characteristics of the Atari computer. These functions, including COL (to set a color register, equivalent to the Atari Basic command COLOR), DRAW, GR (for GRAPHICS), PLOT, SETCOL (for SETCOLOR), SOUND, STICK, and STRIG, are all essentially equivalent to their Basic counterparts.

Summary

For the most part, Atari Interlisp is a well-designed system. The functions which have been implemented seem to be the most essential ones. I experienced no significant surprises in the operation of the system, and the documentation, though limited, is reasonable, except for the problems noted above.

I have been able to implement and develop complex augmented transition network grammars, even though they are painful and embarrassingly slow.

If you know Lisp, I think the comments above should enable you to decide if Atari Interlisp will meet your needs. If you don't know Lisp, this would be a fairly expensive way to learn; other, less expensive, although perhaps more limited implementations may be available.

If you already own the package and are interested in extending the capabilities of Atari Interlisp, I am willing to serve as a clearinghouse for information regarding the operation of the system and for any system utility functions. This system should not be permitted to languish. We will all benefit if we collaborate to increase its power. ☐

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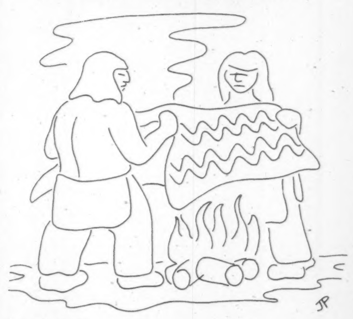

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WordPerfect

Not Quite Perfect, But Certainly Superb

L. L. Beavers

Let me tell you a story. Once upon a time there was a fellow educated in psychology who found himself writing a statistical newsletter for the oil industry. We'll call him Mr. Allthumbs, because he was a lousy typist. Unfortunately, Allthumbs was the only typist he had. So when someone found an error on the final draft of the newsletter, Allthumbs muttered some very unprintable things as he went back for another session with his Selectric.

Eventually his employer replaced the typewriter with a dedicated word processor, and things became considerably easier. Correcting typos took two minutes, instead of 20 minutes of retyping. As the newsletter grew, so did the editing demands. Graphs had to be inserted into the text, so holes of a specific size and shape had to be left. Tables became more numerous and had to be carefully formed to give the proper appearance. The word processor worked fine—at a cost of $12,000 per work station.

Finally it came to pass that Allthumbs left his employer to become a freelance writer in another industry, the newsletter continued successfully under the leadership of another editor, and everyone lived happily ever after.

But I wouldn't have lived happily had I been forced to go back to a typewriter, because I'm still all thumbs. Fortunately, I have found a sophisticated word processing program for my Compaq portable computer: Satellite Software International's *WordPerfect.*

All Business

I wouldn't recommend this program to anyone whose most sophisticated word processing application is an occasional business letter or simple report. For home or most small business use, a simpler program with a price tag lower than $495 would probably be fine. But if you need to do things like tables of numbers, boilerplating text, form letters, sophisticated layout, footnoting, or equations, then I suggest a long look at *WordPerfect.* This is a fast, flexible, all-business program.

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SOFTWARE PROFILE

Name: WordPerfect, version 2.24-L
Type: Word processing
System: 128K IBM PC and Compaq; two disk drives
Format: Disk
Summary: Flexible, sophisticated word processing for business and professional applications.
Price: $495
Manufacturer:
Satellite Software International
288 West Center St.
Orem, UT 84057

Flexible

I think that the greatest asset of *WordPerfect* is its flexibility. I am a great believer in flexibility, and I will put up with a great deal of inconvenience to get it. We shall discuss the price of flexibility later; for the moment, let's just revel in it.

Of course you can't revel if you are with the wrong group. People who process words aren't all alike, so flexibility will mean different things depending on your needs. I think you will find one of the following groups congenial.

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for confirmation of page deletes).

WordPerfect also offers "cut and paste" editing. These features let you define blocks of text (even columns in a table), which you can then save, delete, copy, or move to another place in the document. These capabilities take a little practice to master, but their usefulness repays the effort.

Although your layout needs may not be extensive, you probably would like to preview and control the general appearance of the document. With *WordPerfect* the text on the screen has the same essential form as the printed version. You control, page by page if you wish, all four margins, headers and footers, page numbers (and where they appear), character spacing (10 pitch, 12 pitch, or just about any other spacing you can coax out of your printer), and line spacing. Underlined, boldface, and even overstruck text are also available. With a single keystroke you can center text on a line, and with a slightly more complicated procedure you can center a body of text vertically on the page.

For those tables I said you might want to stick in your reports, there are several handy features. First, tab positions can easily be set and reset. Second, those same tab settings can be used as decimal tabs when you are typing numeric information. This means that the numbers you type are automatically aligned on the decimal point (or on any other character you select—a comma for instance). Third, *WordPerfect* will do simple calculations on the numeric table entries, including row and column totals and subtotals. You can even specify formulas for these calculations, so that this "math" facility has some of the features of a spreadsheet program. Finally, you can protect your table so that a page break will never appear in the middle of it.

> ***Although some word processing systems offer "mail merge" capabilities as extra-cost options, WordPerfect has them built in.***

Having compiled, edited, and tidied up your report, perhaps you would like to send the results, with appropriate variations, to your ten sales reps. Although some word processing systems offer "mail merge" capabilities as extra-cost options, *WordPerfect* has them built in. First you type the body of the document with simple codes inserted where you want the variable information to appear. Then you type a file containing the variations (name, address, "Dear Joe," Joe's sales total, etc.), tell *WordPerfect* to execute a merge, answer a couple of questions, and it happens.

As I said, the general business user is covered—and neatly.

For Writers

If you write for a living, the chances are that you are more sensitive to format and style than the average business user. *WordPerfect* has some features that you might particularly like.

For example, I sometimes like to indent a block of text for appearance or emphasis. *WordPerfect* makes this easy by allowing me to specify a temporary left margin, or even temporary left and right margins, with one keystroke.

WordPerfect also offers hyphenation prompting if a line of text would extend more than a fixed distance into the right margin. This distance, called the "hotzone," can be adjusted to your taste, depending on how much hyphenation you want to do.

Writers in the newsletter business might want to look at three other *WordPerfect* features. The first is a text (or "newspaper") columns feature, which allows you to print up to five columns of text across the width of the page, with the margins for each column under your control. This feature can be turned on or off in the middle of a document.

The second feature right-justifies the text. It isn't clear from the documentation whether or not this is done by proportional spacing.

The third feature is called "printer commands." It could be used to embed typesetter's control codes in your text.

Satellite Software Update

Will Fastie

SSI's text processing products are now at revision 2.30 and incorporate several new features. In addition, SSI now offers a less expensive version of *WordPerfect* and has announced plans for enhancements to both products.

WordPerfect

The price of $495 now includes the dictionary, previously a $145 option. Significant improvements in version 2.30 are the ability to edit two documents simultaneously (and move text freely between them) and much improved prompts and messages (they now resemble the English language). The product is shipped with two versions of the program. The Flash version improves the performance of *WordPerfect* on the IBM PC with monochrome display; the standard version is for color displays or compatible computers.

Version 3.0 is slated for release late this year. According to VP of Marketing Pete Peterson, versions will be available in Finnish, French, German, Italian, Spanish, and Swedish. True proportional spacing, support for displaying and printing the foreign and technical symbols in the IBM character set, and support for additional printers will also be provided.

A sorter for merge files, a $95 option, is now available.

Personal WordPerfect

At $195, this version of *WordPerfect* is a powerful word processor and a bargain to boot. It is almost identical in feature and function to its more expensive brother. In fact, document files are completely interchangeable between the two products. *Personal WordPerfect* does not support columns, math mode, macros, merge, or sort, and some of the more complicated formatting features (e.g., footnotes) are not available. *Personal WordPerfect* does include headers, footers, and page numbering.

SSI plans to offer their dictionary as a $95 *Personal WordPerfect* option. It should be available as you read this.

P-Edit

P-Edit is one of the most powerful program editors around, and its new price of $95 makes it very attractive. For *WordPerfect* users, *P-Edit* is an excellent choice because both products operate using almost identical sequences of keystrokes.

Version 2.30 of *P-Edit* supports dual document editing and Flash. The reviewed version is not totally comfortable in the IBM DOS 2.0 environment, although full pathnames are handled properly.

WordPerfect

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WordPerfect

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For Academics And Professionals

People writing for their academic or professional colleagues have a special set of needs. *WordPerfect* covers several of them.

First, it does footnotes. The footnote numbers appear in the printed text as superscripts, and the note appears at the bottom of the same page. Footnotes are automatically numbered, and, if you insert a new footnote, automatically renumbered.

Second, it does equations. The *WordPerfect* subscripting, superscripting, overstrike, and underlining capabilities can be combined to produce quite complicated mathematical statements. With the same set of capabilities, you could also produce chemical formulae. It is not particularly easy, but then it is not particularly easy on a typewriter either.

Finally, it does boilerplating. The term "boilerplating" describes a process in which a document is assembled from a collection of standard chunks of text. Attorneys use boilerplating to prepare many of their documents. Although most word processing programs allow you to merge a file from the disk into one that you are working on, *WordPerfect* offers some very extensive facilities for planning and automating the process. These facilities even include allowing the user to write prompt messages telling the operator what file to merge at each point.

All things considered, I think WordPerfect is a superb package.

The Price

Now you know what I meant when I said that *WordPerfect* was flexible. I also said that we would count the cost. It is time.

The program lists for $495, but that's not the cost I mean. If you intend to make full use of the capabilities of *WordPerfect,* plan to spend a good deal of time learning it, and plan to tolerate a few operational inconveniences while using it. Those are hidden costs, but they are no less real than the price of the program.

I find the bargain more than eq-

A Word From A WordPerfect Fanatic

Will Fastie

I admit it: I'm a *WordPerfect* junkie. I firmly believe that for the majority of tasks, *WordPerfect* is the word processor of choice on the IBM PC; *Personal WordPerfect* answers a low-end need.

Now this comes not only from PC experience, but from two years of using *WordPerfect* (WP) on Data General computers before there even *was* a PC. If only you could have witnessed my mental state during the period when I used *WP* daily at work, only to come home to other, unmentionable programs. It was cause for major celebration when the first version of *WP* arrived at my doorstep.

I agree with almost everything in Mr. Beaver's well-balanced review of *WP.* I would like to add a few personal observations.

Navigation—Of all the text editing packages I have used, none offers a more elegant method for moving around in a document. The cursor arrow keys have their usual meaning, of course. But prefix a cursor key with a depression of the Home key, and the cursor moves a little further, to the appropriate edge of the screen. Prefix with *two* Homes and the cursor goes even further, to the appropriate edge of the *document* (i.e., beginning, end, left- or rightmost margin). Use the control key with the left or right arrows and the cursor moves word by word. Prefix with an Esc and the cursor moves some number (eight is the default) of characters on a line or lines on the page. These sequences are the most natural and easy-to-remember I have ever encountered.

Range—*WordPerfect* deviates from the norm with its handling of blocks. However, the deviation creates greater power. Most important, "ranges" can be marked in either direction, and can be arbitrarily large (*everything* in *WP* is limited only by disk space). In addition to their use with block move and copy, ranges can be used for marking text to be underlined, bolded, deleted, converted to upper- or lowercase, written to a file, or appended to a file.

Dictionary—The speller program is unique because it operates interactively from within *WP*, displaying spelling errors in context, and allowing correction or dictionary update. It lacks only the ability to check the spelling within a range. A stand-alone program is included for dictionary maintenance and checking of non-*WP* documents.

Formatting—*WP* is a "what you see is what you get" editor, meaning that the text is always displayed exactly as it will be printed. It is true that *WP* sometimes disturbs its own display when text is being inserted or modified; sometimes it downright mangles. The rule is that everything above the cursor (between the cursor and the beginning of the document) is correctly formatted, while anything after the cursor may not be. Therefore, moving the cursor forward also reformats, and *WP* makes sure the document is correctly formatted before it is saved to disk or printed. Rewrite Screen can usually be a last recourse.

Keyboard Templates—Until now, they have been terrible. The newest version, a one-piece plastic affair, is acceptable. I like templates because they provide an instant menu. You hate 'em, you love 'em, but you definitely can't live without 'em. SSI also provides transparent stickers for certain important keys.

Documentation—*WordPerfect* documentation has been rewritten and reformatted. It is better organized for reference without sacrifice of its tutorial qualities. It is also typeset and easier to read.

Help—I originally learned to use *WP* without cracking the manual because the help facility was so good. In general, depression of the Help key followed by depression of a function key causes display of fairly detailed information about that function. If the function key normally displays a menu, Help usually displays one too and allows a further level of selection.

Macros—If *WP* can't do what you want, you can usually train it to do so. Although SSI documentation has never explained the feature very well, it is extraordinarily powerful once understood.

Learning Curve—*WordPerfect* is somewhat harder to learn than most word processors with which I am familiar. My experience indicates, however, that once trained, the *WP* user has great range, taking advantage of more of its features and power than he or she would with other programs. The climb up the hill is worth it in the end.

uitable, but to help you decide for yourself I have listed a few specific annoyances in the Nuisance Table below.

For You?

If the price seems right, *WordPerfect* may well be the word processor for you. The program is flexible and fast. It offers decent documentation (in the form of a good tutorial), very good on-line help, and a very nice set of System Commands to help with disk file handling and other useful things.

WordPerfect supports Epson (with Graftrax), Diablo (1650, 3515, and 7715), Qume (Sprint 5 or 9), Spinwriter (5515, 3515, and 7715), and NEC 3550 printers. Printers not compatible with any of those can be used, but some of the capabilities of *WordPerfect* will be lost. *WordPerfect* also supports some cut-sheet feeders with these printers.

Nuisance Table

Mnemonic Commands	There aren't any, unless you find a natural association between ALT-9 and "Move." If so, please see a psychiatrist at your earliest convenience.
Keyboard Templates	These strips of plastic lay about the keyboard to remind you of what all those unmnemonic commands mean. They get in my way.
User's Manual	What is well organized as a tutorial isn't well organized for reference.
Rewrite Screen	Inserts sometimes cause the screen format to go haywire. A "Rewrite Screen" key fixes the problem immediately, but it is disconcerting at first and very slightly anncying later.

I suggest you experiment before you decide whether your printer is, or is not, compatible. I had some problems setting up my "Diablo compatible" printer with *WordPerfect*, so I called Satellite Software International's toll-free customer support number. The man I talked to suggested that I tell *WordPerfect* that my printer was a Qume. It now works perfectly. I don't know why, and neither did he.

I have called the customer support number twice. I talked to two different people, and both were knowledgeable and helpful. The one who helped with the printer problem stayed on the telephone with me while I tried the solution he had recommended. Neither person could have known I was a reviewer, so I must assume that they offer the same excellent support to all of their customers.

All things considered, I think *WordPerfect* is a superb package. The sophisticated functions take some time to learn, but the ones needed most often tend to be the simplest to use. I recommend *WordPerfect* to anyone needing more than minimal word processing capabilities and not allergic to learning some details. I especially recommend it to those of you who are all thumbs. ☐

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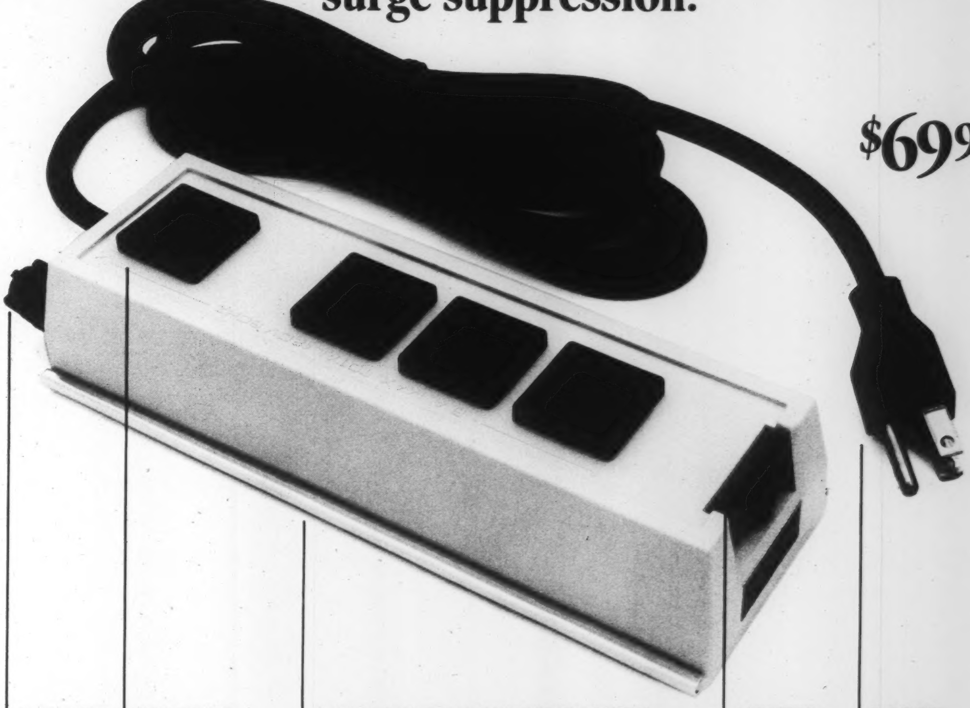

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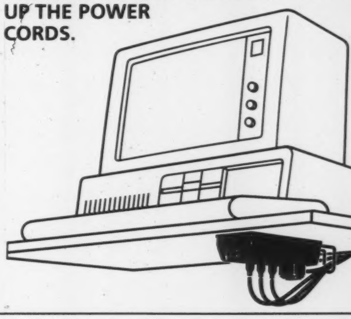

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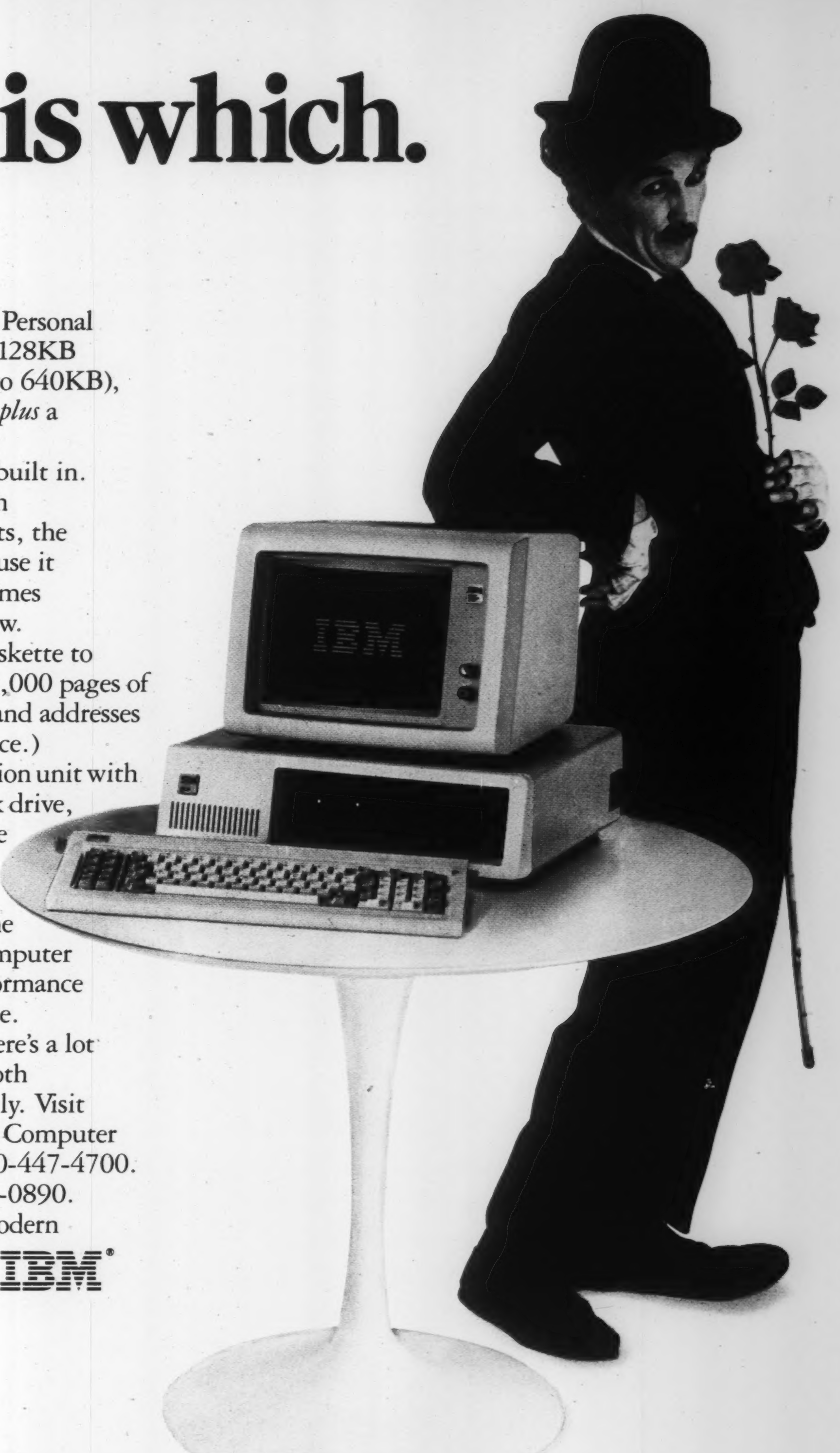
The IBM Personal Computer

which is which.



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And by adding an expansion unit with a *second* 10-megabyte fixed disk drive, you get even more high-volume capacity from the system. XT can run most of the same software and accept most of the same IBM hardware as the computer on the left. And its price/performance is nothing less than remarkable.

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A Free-Form Filing System For Apple

Instant Recall

Brian J. Murphy

Do you ever get the feeling that computer filekeeping isn't the miracle of automation that it's supposed to be? Searching computer files for bits and pieces of lost information can be almost as dreary as sifting through sheets of paper in a filing cabinet.

A new filekeeping program, *Instant Recall* by Charles R. Landers from Howard Sams & Co., Inc., does away with the least attractive aspects of computer filekeeping. *Instant Recall* does for Apple II filekeeping what computer filekeeping did for conventional paper filing methods. This system re-automates the entire process of keeping files.

Before we examine the program, let's examine two of the problems which inspired it.

Instant Recall ***is a free-form file cabinet.***

One problem is that some data can be categorized under two headings. In maintaining a home recipe file, for example, you might try to figure out where to file your recipe for boeuf bourguignon. You could file boeuf bourguignon under *French Cuisine, Stews, Main Courses,* or *Beef Dishes,* just to name a few possibilities.

Of course, you could choose to file it under all those categories, but then you would have to enter all that data into every file. With most home filing systems, including the Shell Cabinet supplied by Apple, you must re-enter all of the recipe information for each of your four databases. Chances are you will decide it really isn't worth the trouble.

For another aspect of the same problem, suppose someone else is searching your data looking for boeuf bourguignon under *Beef Dishes* not knowing you filed it under *Stews*. You can bet the information will be hard to retrieve.

Let's examine another problem: half-remembered data. Let's say you are a sales representative and have decided to use your Apple II to compile a file on all the contacts on your route. You like to keep your sales calls friendly and personalized, and one of your techniques is to "remember" important personal data, such as awards, birthdays, and anniversaries of your clients. One day, as you are about to start a circuit of the four dozen contacts on your route, you remember that one of your clients has a son named Bruce who will enter college this month. You want to mention him to your client, but which of your contacts is Bruce's father?

It is in your Apple files, but would you want to sit down and scan all 48 records to see whose son it is? Suddenly, the file you have struggled to set up has diminished dramatically in value to you, because it has become a nuisance to work with it.

Solutions

Instant Recall is a free-form file cabinet. You can create files that combine related or unrelated data as you please; you will have no trouble retrieving the information instantly. *Instant Recall* features a unique key word search feature that allows you to call up a file using *any* word that may occur in any part of that file.

That is a very powerful feature. All you have to remember to access any desired file is any word at all that may occur in that file. The more specific the better, of course, but you can be sure that if you have even the slightest idea what you are looking for, you will find it.

Remember our example of the sales rep trying to remember which of his clients is Bruce's dad? All he would have to do with an *Instant Recall* file is to find his database on clients and search for the word *Bruce*. The *Instant Recall* file will find every *Bruce* in the database.

This search capacity makes the categorizing of information less restrictive. Remember the home recipe file? There is no need to enter the boeuf bourguignon recipe in your file on stews, then to repeat the process for beef dishes, main courses, and French cuisine. You can recall the recipe by searching the files for

creative computing

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bourguignon or any other word that may occur in the recipe. If you like, when you save the recipe, you can add to the file the various categories into which the recipe falls as key words. Then, searching the words *stew*, *French/cuisine*, *beef/dishes*, and *main/courses*, will always yield the recipe.

Notice that some of the search keys were actually two words. That is another powerful *Instant Recall* feature. Our sales rep could use the double key word feature to find the missing college student by searching *Bruce/college*. The system will bring up only those files in which both of those words appear. This helps to narrow the search and speed the process.

Learning to use this filekeeping system takes only about an hour or so of study, using the tutorial that comes with the program. Once you are set up (file disk must be formatted for *Instant Recall* using a special initializing utility in the main program), simple commands allow you to enter the files, save them to disk, clear memory, and create new files.

Learning to use this filekeeping system takes only about an hour or so of study.

Creating Files

Extensive editing capabilities make *Instant Recall* seem like a word processor for data files. Editing functions allow you to write over errors, remove lines, and close up the text, or open up a space for new text between lines. Automatic features like wraparound, which prevents the splitting of words from one line to another, help keep the text orderly and readable.

Instant Recall has automatic features which allow you to use your disk space more effectively. While you are entering text, a numerical display counter at the top of the screen tells you how many entries there have been in the file so far and which entry you are working on. As you write and save files, the system keeps track of how many characters you have left in your file. An Apple standard disk can hold four *Instant Recall* files of 28,000 characters. With two drives you can simultaneously handle as many as 229,000 characters in eight files.

Documentation

The documentation is designed to be very user-friendly and supportive. The system itself allows you to add as much or as little structure to your files as you please. You don't have to set up and stick to rigid fields of information, the way you would with a Shell Cabinet type filekeeping system. You write your files to suit yourself; you are not forced to input the information in predetermined order.

It is also worthwhile to mention that this system operates at a very high rate of speed. *Instant Recall* boots up quickly, and the maximum loading time for any file is five seconds or less. When you use the catalog command, you see the list of all four files on your disk. Into this list you may put any descriptive titles you want to simplify your searches. Once you are in the desired file, you can speed your searches by using the double key word feature.

Printing

Sooner or later you will want hard copy duplicates of your files, and you will find that *Instant Recall* handles this chore with grace. With some file programs, turning on the printer commits you to printing everything you call up. When you address the printer with *Instant Recall*, however, you won't print the files until you give a specific command to dump the records to the printer. This means you don't have to access the files once to find your data and a second time to print out your hard copy.

Instant Recall *is full of nice surprises.*

A Former Incarnation

Instant Recall is still floating around at some computer stores under its original title *PDQ*. The difference between the two packages is in more than just the title. The newer program is fully compatible with the Apple IIe, making good use of its new features including upper- and lowercase (much better printed copy), shift lock, and other editing functions. The newer manual contains instructions for use with all versions of the Apple II. The programs are also compatible with the Apple III in the Apple II emulation mode.

The greatest strength of the program, its free-form filekeeping capability, makes it less than ideal for some business applications, specifically report writing. The formlessness of the program does not lend itself well to the formality of a corporate environment. The program can be made to adapt, of course, if your Apple has upper- and lowercase and if you are willing to enter or edit the reports in a manner suitable for the requirements of your project.

In the final analysis, *Instant Recall* is best suited to be a personal data bank, a place to keep memos to yourself, information you have trouble classifying (but know you will need sooner or later), and the information you need on a daily basis.

Instant Recall is full of nice surprises. It has a good many capabilities which you can explore, and you will find that you pick them up quickly and easily. One night's practice should make you an *Instant Recall* veteran—and enthusiast. ☐

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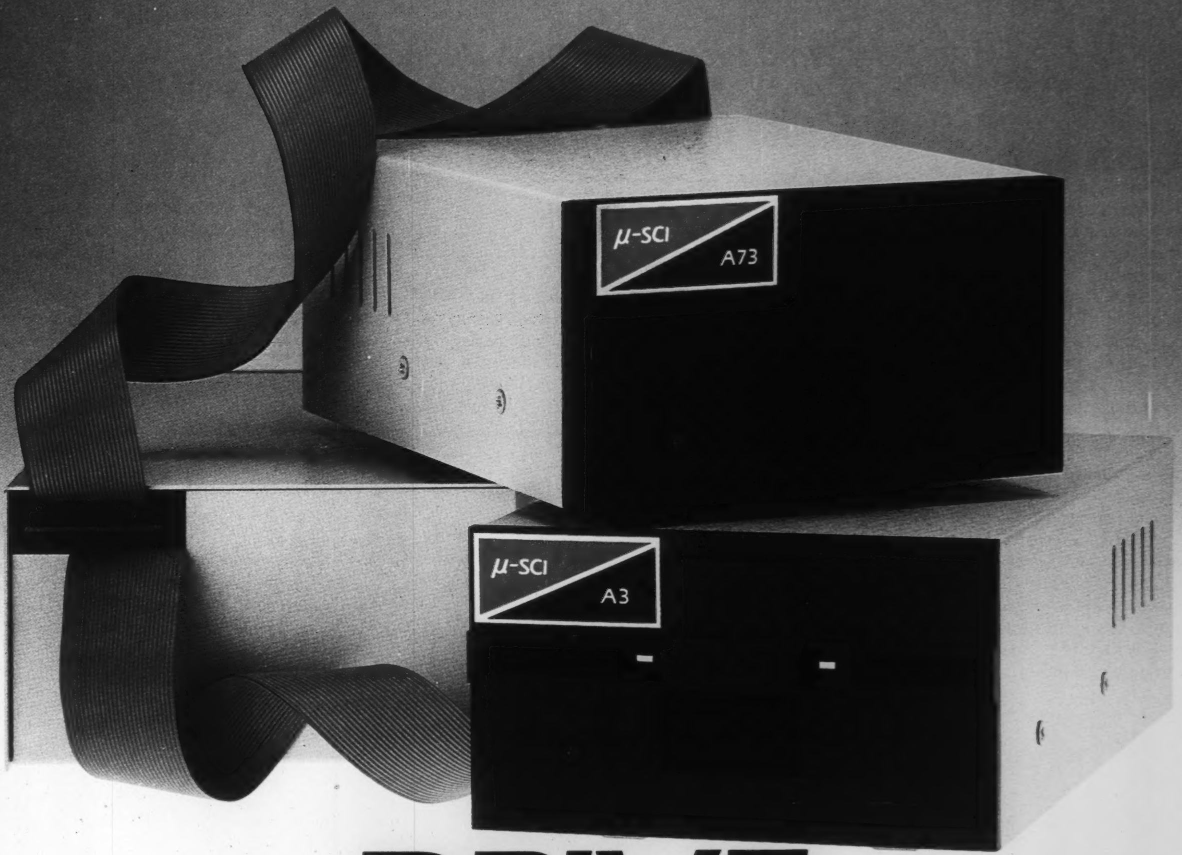

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Wordcraft

Word Processing On A Budget

Joe Devlin

Throughout the land, salesmen in K-Marts, Penneys and other haunts of low cost computers are being asked the same question by customers looking for computing bargains. "Sure it is cheap, but can it do serious work like word processing?"

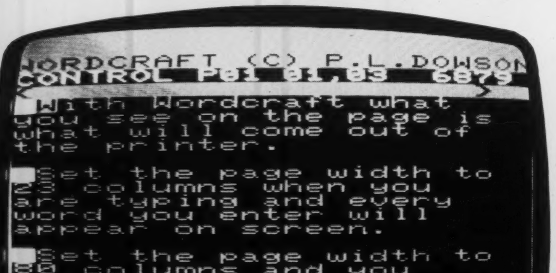
I, myself, have been asked this question more times than I care to remember. Since pay scales of salesmen are based on their loquacity and ability to elaborate creatively on the facts, you can guess what the salesmen answer. I had no merchandise to sell and hence tried to be as honest as experience allowed. "Can it do serious work like word processing?" they asked. "Sure," I replied, "but you get what you pay for, and the cheaper system will have limitations." I sounded like a salesman hedging his bets. The truth was, I had never spent much time playing with a low cost word processor running on a low cost computer—until *Wordcraft 20* arrived.

Each staff member at Creative has at least one favorite package, and he argues vociferously on the relative merits of his pet word processor. Word processors are a bit like home cooking—one likes best what one tastes first. My first word processing package, and the package I still use at home, runs on my trusty old Commodore 8032 computer. It is called *Wordcraft.*

> ***Word processors are a bit like home cooking—one likes best what one tastes first.***

The computer business is a volatile one. Old machines die and become extinct. The 8032 has always been an also ran in the United States. Nevertheless, it is a beautiful machine for a writer. It has a large green screen with an 80-column display and good looks that make it a popular extra in commercials and futuristic TV shows.

In Europe, Commodore is king. Commodore supports its business machines there, and lots of software is written for these machines. In the United States the story is different. The 8032 was never aggressively sold in the States and never caught on here. Within the U.S., Commodore has concentrated its efforts on promoting lower priced machines. Exit

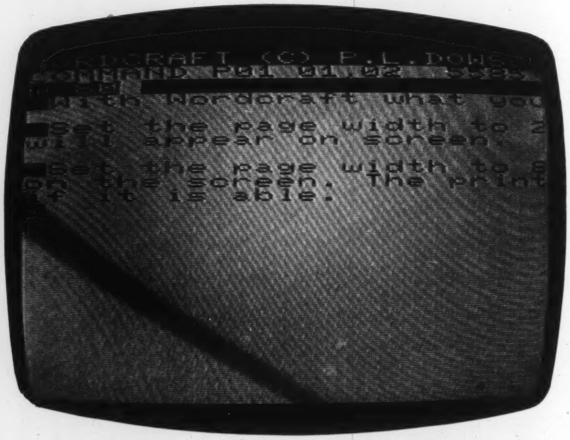


```
WORDCRAFT (C) P.L.DOWSON
CONTROL P01 01,03  6879
 With Wordcraft what
you see on the page is
what will come out of
the printer.

 Set the page width to
23 columns when you
are typing and every
word you enter will
appear on screen.

 Set the page width to
80 columns and you
will see only a
portion of the page on
the screen. The
printer, on the other
hand, will print out a
full 80 columns if it
is able.
```

You can set the screen color to dark blue and the line width to 23...



```
RDCRAFT (C) P.L.DOWS
OMMAND P01 01,02
 80
With Wordcraft what you

Set the page width to 2
will appear on screen.

Set the page width to 8
on the screen. The print
if it is able.
```

or set the page width to 80 and the background to light blue.

creative computing
SOFTWARE PROFILE

Name: Wordcraft 20
Author: P.L. Dowson
Type: Word processor
System: Commodore Vic 20
Format: ROM cartridge
Language: Assembly language
Summary: Fast, powerful, and relatively easy to use
Price: $99.95, $199.95 with extra 8K RAM
Manufacturer:
United Microware Industries, Inc.
3503 Suite C
Pomona, CA 91768
(714) 594-1351

the 8032 and enter its low cost relatives the Commodore 64 and the Vic 20.

I was not surprised when a version of *Wordcraft* for the Vic 20 arrived at Creative. The Vic is, to a large extent, a redesign of the older Commodore computers; hence conversion of software between machines is relatively painless. It was natural that someone should convert the successful *Wordcraft* line to the Vic and the 64. Finally, I had the opportunity I had been waiting for, the chance to compare a word processor that runs on an 80-column machine with one that runs in 24 columns on a computer that sells for under $100.

I was prepared to find a very limited software package. That is not what I found. I have always been impressed with the 80-column version of *Wordcraft* (presently called *Wordcraft Ultra). Wordcraft 20* lives up to the standard set by its big brother. It is fast, it is powerful, and it is relatively easy to use.

If you have the money to invest in a more expensive computer, you can buy plenty of expensive word processing packages that will offer more tricks than those available from *Wordcraft 20.* You will be hard pressed, however, to find a package that exceeds the speed, power, and ease of use that *Wordcraft* offers.

Features

Although the list of features offered by *Wordcraft* is impressive, it is not the list of features but rather the ease with which they can be implemented that first caught my attention. Anyone who uses a word processor knows that he uses the same elementary functions over and over again.

A good word processing package must allow for easy creation of new text, fluid movement of words and phrases within the document, the quick insertion of new material, and the erasure of words that no longer seem to fit. Both versions of

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Wordcraft, continued...

Wordcraft perform the basics with style and ease.

This is not to imply that *Wordcraft* can perform only the basics. *Wordcraft Ultra* is not only easy to use, it is sophisticated. To my surprise, I found that the programmer who converted *Wordcraft* for the Vic had managed to pack most of the features that attracted me to *Wordcraft* into the ROM cartridge that bears *Wordcraft 20.*

The two versions of *Wordcraft* share an extensive repertoire of attractive features. The automatic word wrap feature eliminates broken words. Automatic line centering and definable tab stops allow for easy positioning of words on the page. Search and replace can be used to make quick changes. The status lines that appear on the top of the page let you know which page you are working on, where the cursor resides on that page, and how many characters of memory space remain.

Page length and page width can be changed with the stroke of a few keys. A built-in mail list program provides the ability to fill names, addresses, and special phrases into letters for personalized correspondence. If your printer allows, it is possible to underscore text or to print in boldface, and text can be right justified or left ragged.

Wordcraft Ultra does offer some features not offered by its little brother, most significantly automatic page numbering, and automatic headers and footers. *Wordcraft 20,* on the other hand, makes good use of color within the program to let you know what is going on. It also allows you to change the color of the cursor, erase block, text, and screen background to suit your needs.

The two versions of Wordcraft share an extensive repertoire of attractive features.

Function keys not found on the older Commodore computers that run *Wordcraft Ultra* are used to provide easy single stroke access to the most often used commands on the Vic.

These features are icing on the cake. They may be used only occasionally by the average user, or they may be used frequently by those with special needs. But if the basic commands didn't work well, patience would run out long before the fancy features were invoked. Other word processors may offer more features, but few packages work as elegantly as *Wordcraft* does.

creative computing
SOFTWARE PROFILE

Name: Wordcraft Ultra
Author: P.L. Dowson
Type: Word processing package
System: Commodore 8000 series computers
Format: Disk
Language: Assembly language
Summary: Fast, powerful and relatively easy to use
Price: $450
Manufacturer:
Microsci
2158 S. Hathaway
Santa Ana, CA 92705
(714) 662-2801

What You See Is What You Get

Wordcraft is a screen based word processing system, one in which what you see on the screen is what comes out of the printer. To my mind it is the best approach to take with a word processor.

Not all word processing packages are screen based. Some have you embed special characters into the text that appear on the screen. These embedded characters (for example the phrase . . . page to force a new page) usually remain on the screen, taking up space and cluttering the page. The commands do not appear on the printed page. Instead, they affect the way in which the page is printed (. . . page causes the printer to start a new page). In *Wordcraft* you edit text as it appears. If you tell the computer to skip a page it will skip a page both on screen and when printed out. There are no embedded commands appearing on the screen where only your words should be.

Wordcraft accomplishes this feat by using two modes. The Typing mode is used for entering text and the Command mode is used for entering commands. Either mode can be reached at any time with the stroke of a single key. There is no need to exit to a menu and call up a version of the document that shows how it will appear when printed and then go back to a type mode and remember what needs to be changed.

Neither does *Wordcraft* make use of on screen menus. All the commands must be memorized. This does take a little time. You command *Wordcraft* with easy-to-remember mnemonics such as the W for width or P for print or with the function keys. The advantage of this method is that there are no menus to wait for and no menus to clutter up the screen. In the place of the menus,

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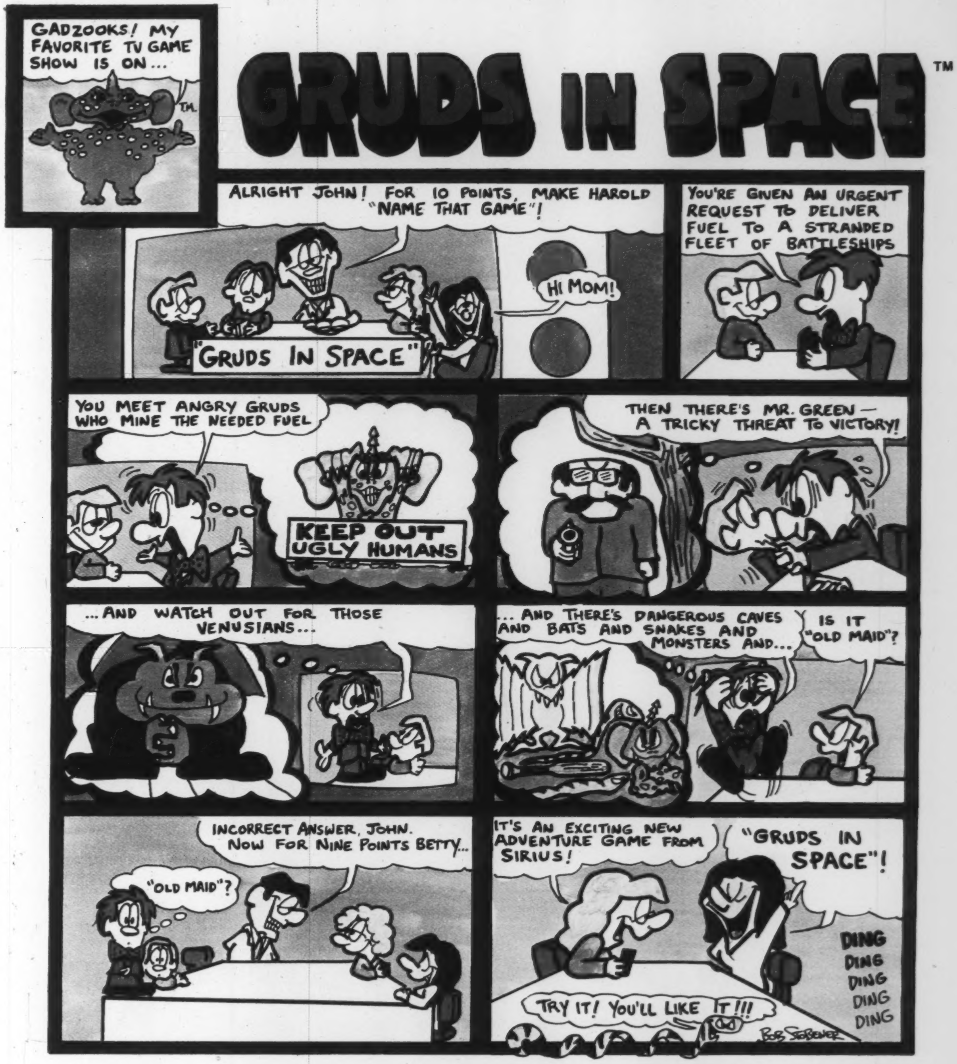
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...AND THERE'S DANGEROUS CAVES AND BATS AND SNAKES AND MONSTERS AND...
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INCORRECT ANSWER, JOHN. NOW FOR NINE POINTS BETTY...
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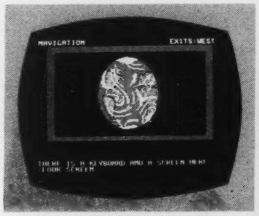
NAVIGATION
EXITS:WEST

```
THERE IS A KEYBOARD AND A SCREEN HERE
>LOOK SCREEN
```

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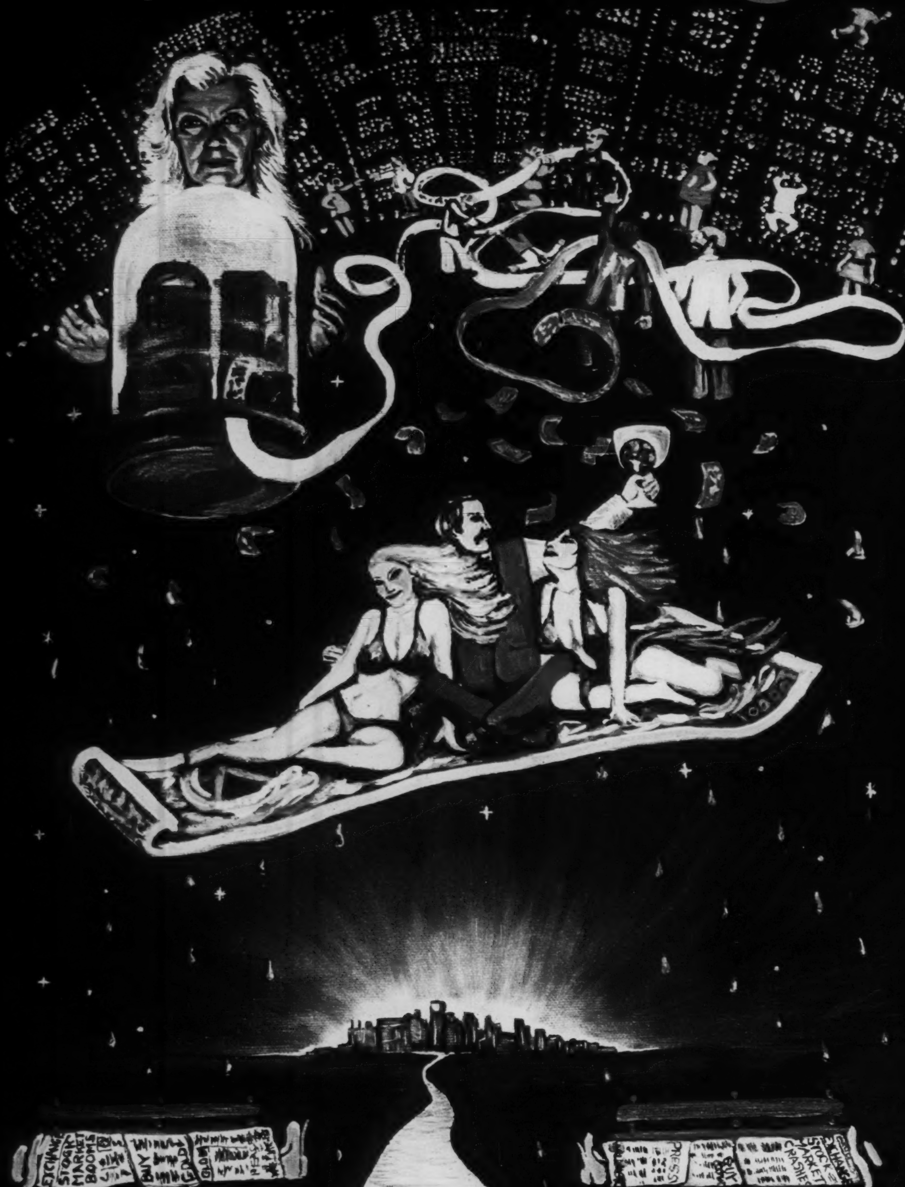
The Exchange



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Wordcraft, continued...

Wordcraft uses the top three or four lines of the screen to keep you informed about where you are in the document and what you are doing.

The screen based approach works best on a computer that displays a full 80-column screen at a time. Although *Wordcraft 20* can create and print 66 lines of 99 characters, the Vic screen can display only 25 lines of 24 characters at a time. Once you type the 25th character of a long line, the screen automatically scrolls over to let you see the next 22 characters. Scrolling across the page to see what is on the other side is no fun. Obviously it is much more convenient to work with *Wordcraft Ultra* which offers a full 80-character page width.

One of the nicer features of both versions of *Wordcraft* is the ability to reset the width of the page painlessly in the blink of an eye. This provides a solution to the restricted page width of the Vic. On *Wordcraft 20* I set the page width to 23 characters so I can eliminate scrolling, and then I reset to full page width when it comes time to print.

> ***The Vic imposes its limits of small screen size and memory on the software, but the package is superb, nevertheless.***

The Constraints Of Memory

Another difference between the two versions of *Wordcraft* results from the amount of memory available to each program. *Wordcraft Ultra* is supplied on disk. *Wordcraft 20* is supplied in ROM cartridge and plugs into the Vic like any game or memory cartridge. *Wordcraft Ultra* must be loaded into memory to operate. *Wordcraft 20* operates within the ROM and does not chew up memory space. This is fortunate, because there is no room to load the 16K *Wordcraft 20* program into the memory of the Vic.

You can buy *Wordcraft 20* with or without an extra 8K of RAM memory space built into the cartridge. If you have already purchased a memory expansion cartridge for your Vic, buy the cheaper cartridge without memory. If not, you will need the extra memory offered by the more expensive version.

I used the version with the extra 8K. It provided me with a little over 7000 characters of storage space. This translates into about four 80-column, double spaced pages. Obviously, *Wordcraft Ultra* running on a machine with much more memory can store many more pages within memory. Memory is not, however, the only place to store text.

If you need to create a document that will not fit into memory, you can do so by breaking it up into separate documents each with a separate name. *Wordcraft 20* gives you the option of saving these documents to either disk or tape. *Wordcraft Ultra* saves all its documents to disk and offers the option of dividing pieces of a large document into chapters with the same document name but different chapter numbers. Chapters can be linked together and printed out automatically. You can, of course, print as many documents as you like from *Wordcraft 20,* but each document must be loaded and printed separately.

Included in the price of the *Wordcraft 20* is a 31-page user's manual and a cassette full of useful routines such as an instruction program, mailing management routine, and a conversion program that allows files to be transferred from *Wordcraft 20* to other versions of *Wordcraft.*

The manual is easy to follow and well written. It begins with a 14-page tutorial that gets you started with the basics—how to type in a new document, edit it, print it, save it to disk or tape, and then retrieve it.

Plug the cartridge in, connect up the TV and turn the computer on and follow the tutorial. Within an hour or so you should have the fundamentals down pat. Finish the tutorial and you will have learned to perform all the routine functions required by most word processing applications.

The next time someone says to me "Sure the Vic is cheap, but can it do serious work like word processing?" I will tell him about *Wordcraft 20.* The Vic imposes its limits of small screen size and memory on the software, but the package is superb, nevertheless.

The *Wordcraft* line continues to grow. UMI will have released a $99 *Wordcraft* cartridge for the Commodore 64 by the time this article is printed. If you already own a Vic and want a word processing package for your machine I highly recommend *Wordcraft 20.* If you don't already own a Vic, check out *Wordcraft* for the Commodore 64. Running *Wordcraft* on the Vic requires the purchase of at least an extra 8K of memory. The Commodore 64 has more than enough memory built in. You may find that the savings you will realize by not having to buy the expanded memory version for the Vic will almost account for the difference in price between the Vic and the 64. ☐

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	Multitool Word	MSDOS	NEW!	$ 375	$275
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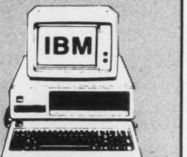

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★	Quadlink, Apple II Emulator **NOW IN STOCK**	NEW!	$ 680	Call
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	Quadboard 64K, expandable to 256K, 4 function board		$ 395	$ 285
★	Quadboard 256K, four function board		$ 595	$ 425
	Quad 512+, 64K plus serial port, expandable to 512K		$ 325	$ 275
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	Microfazer, w/Copy, Par/Par, 128K, #MP128 w/Power Supply		$ 465	$ 345
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★	12" Amber, #300A	$ 210	$ 159
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★	13" Color III, RGB, Commercial. (Ap. II, III)	$ 479	$ 399
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	Quadrscreen 17", 968 x 512, 2 pages, w/cable, card, disk	$1995	$1595
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	12" Green, Model DM8112CX	$ 260	$ 199
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Smartmodem 1200 (RS-232)	$ 699	$ 535
IBM-PC Smartmodem 1200 B plus Smartcom II	$ 599	$ 439
Micromodem 100 (S-100 bus)	$ 399	$ 275
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NOVATION, Applecat II Modem, 300 BAUD	$ 389	$ 269
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	10 each, 5-1/4, DS, DD, 48T (IBM, H/P, etc.)	$ 89	$ 49
	MAXELL, 10 each, 5-1/4, MD-1, SS, SD or SS, DD	$ 55	$ 29
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	A40 A70 Controller Card	$ 100	$ 79
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	Elite 2, 326K, 80 Tracks	$ 649	$ 415
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	Elite Controller w/Manual & Diskette	$ 145	$ 84
TEAC	✱143K Disk Drive, 1/2 High	$ 379	$ 279
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VISTA	Solo, 5" 143K Disk Drive Std. Height	$ 300	$ 249
	Controller Card	$ 89	$ 75
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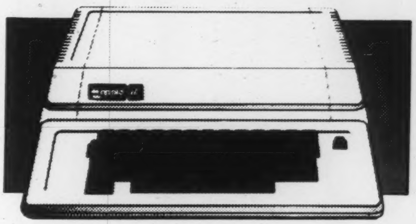

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Microsoft, 16K RAMCard for II +	$ 100	$ 69
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★ List Handler	$ 90	$ 35
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Visicalc 3.3	$ 250	$169
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Central Point, Filer, DOS 3.3 and Utility	$ 20	$ 15
★ Copy II Plus (bit copier)	$ 40	$ 35
Epson, Graphics Dump	$ 15	$ 9
Insoft, GraFORTH by Paul Lutus	$ 75	$ 59
Microsoft, A.L.D.S.	$ 125	$ 75
BASIC Compiler	$ 395	$299
Cobol 80	$ 750	$559
Fortran 80	$ 195	$149
TASC Compiler	$ 175	$159
★ **Omega**, Locksmith (bit copier)	$ 100	$ 75
Penguin, Comp. Grphcs. Sys. NEW!	$ 70	$ 53
Graphics Magician NEW!	$ 60	$ 41
Phoenix, Zoom Grafix	$ 40	$ 34
Quality, Bag of Tricks NEW!	$ 40	$ 29
Saturn Systems, VC-Expand	$ 100	$ 49
VC-Expand 80	$ 125	$ 69
Sensible, Back it Up, (bit copier)	$ 60	$ 49

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Broderbund, Choplifter	$ 35	$ 26
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Continental, Home Accountant	$ 75	$ 49
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Hayden, Sargon II (Chess)	$ 35	$ 29
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Two Unusual Programs In Pascal

The Incredible Jack & Think Tank

Steve Arrants

It has been predicted that Pascal will eventually replace Basic as the language of choice for microcomputing. Easy to understand, quick to use, and versatile, Pascal is a good choice for some applications. In fact, software authors are beginning to use Pascal in commercial programs.

It will take a long, long time before Pascal beats Basic, however. There is just too much of an investment in Basic software. But as more quality Pascal software is marketed, its following grows and becomes more loyal.

The two packages reviewed here exploit the main strength of Pascal—text processing. Both could have been written in Basic and assembly language. They probably wouldn't have been as easy to write or use, however.

The Incredible Jack is a word processor/spreadsheet/database package all on one disk, in one program. It is impressive not so much for what it does, although it does a good job, as for what it sets out to do. *Think Tank* is an "idea processor." Really nothing more than an outline generator, it sounds like another wasted application. The surprising thing about *Think Tank* is how useful it is once you get accustomed to its commands and formats. I think you will be impressed.

The Incredible Jack

When this package was handed to me for review, I couldn't believe that the people at Business Solutions Inc. were serious. A word processor *and* a database *and* a spreadsheet on one disk? To top that, the documentation is a 125-page book about the size of a floppy. It couldn't work. There was no way that all that code could be packed onto one side of one disk. One boot of this disk, and that would be it. The software would be so incredibly bad, so bare bones, that reviewing it would be a joke.

OK, I was wrong. *The Incredible Jack* does what it says it will do, and it is all on one disk. The idea behind the development of *The Incredible Jack* is that bundling the most used and useful types of business software will please many people: no more trying to insert *VisiCalc* files into a *WordStar* report; no complex formatting of tables or information into a database. One program would do it all. Apple owners would have something resembling the IBM PC package *1-2-3* from Lotus, a software package that fully integrates the three most important business operations—organizing data, manipulating data, and printing data.

The Incredible Jack *does what it says it will do, and it is all on one disk.*

Well, if you want the best of those three operations, you will still have to purchase three different software packages. Like a Renaissance man, *The Incredible Jack* does many things well, but none superbly.

That is not to say that it doesn't impress me or that it is useless. After all, great software has to start somewhere. And a strong point in its favor is its ease of use. It is not like learning *WordStar*, *VisiCalc*, and *DB Master* all at once. The different parts of this program work in harmony, producing an easy to learn and easy to operate piece of software.

Using Jack

If you have ever written a letter on a word processor, writing a form letter should be easy. If you have mastered form letters, creating a database file is almost as simple. Include a way to do calculations on database fields, and you have *The Incredible Jack*.

Calculations with *The Incredible Jack* are not the type users of spreadsheets are used to. There are no rows and columns or cells. In this package, they are called labels. Just because it doesn't look like *WonderCalc* or any of those other spreadsheets doesn't mean that *Jack* can't do sophisticated calculations. For example, let's say you are printing billing notices. If one client hasn't paid in 90 days, that data in one label could cause an extra warning in his letter or print out a stronger letter.

Again, I must stress that you don't move from calculations to the database and then into the word processor. All the commands are available at any time. There is no need to save a calculation file and reload it on your word processor. This is the most impressive feature of *The Incredible Jack*: all the features are available instantly.

The screen is divided into four sections: a command line, a tab line, the work area, a footnote area, and a status line. The prompt messages are almost completely self-explanatory. Enter D for the

creative computing
SOFTWARE PROFILE

Name: The Incredible Jack
Type: Word Processor, Data Base, Calculator
System: 48K Apple II
Format: Disk
Language: Pascal
Summary: Easy to operate, well-integrated package.
Price: $129
Manufacturer:
Business Solutions, Inc.
60 E. Main St.
Kings Park, NY 11754

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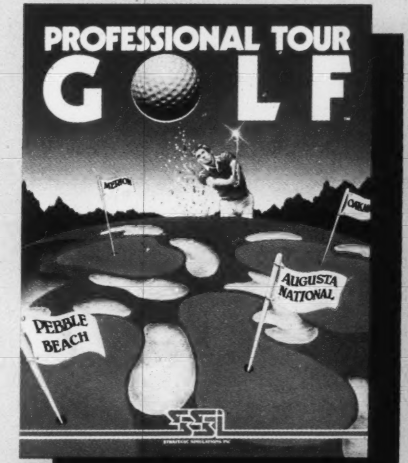
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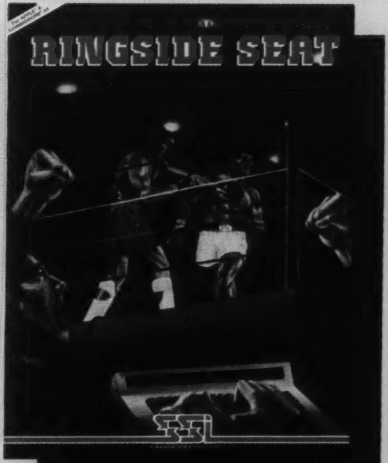
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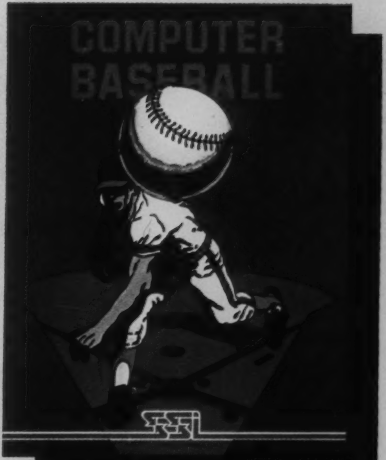
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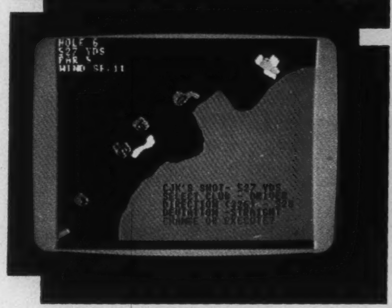
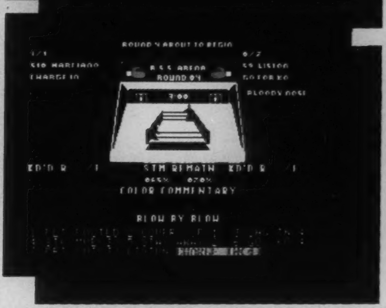

HOLE 6
527 YDS
PAR 5
WIND SE 11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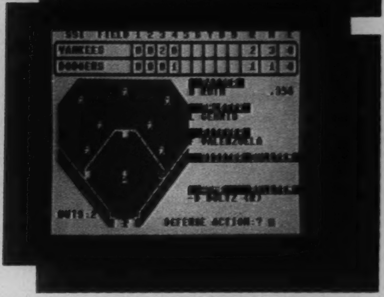
BLOW BY BLOW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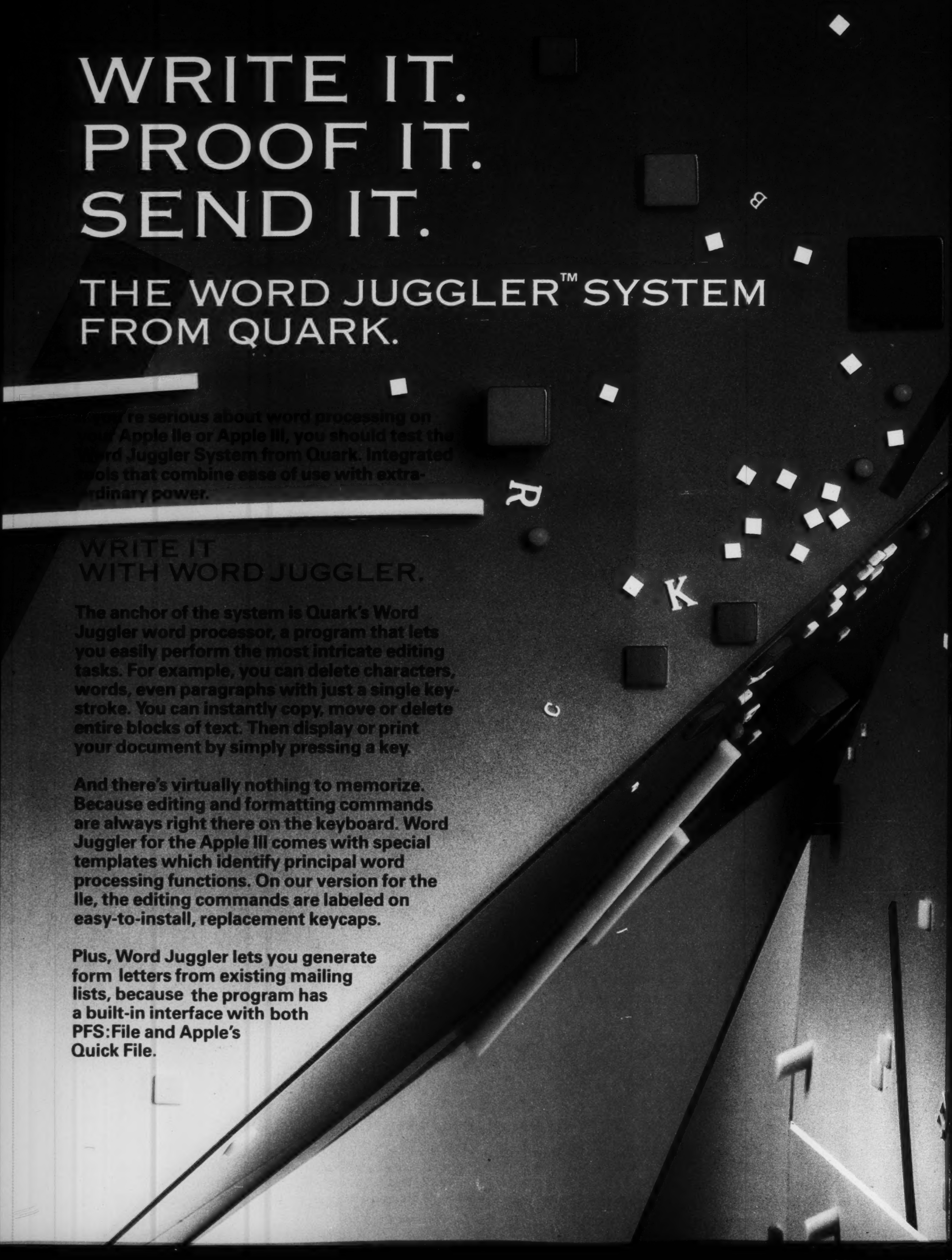

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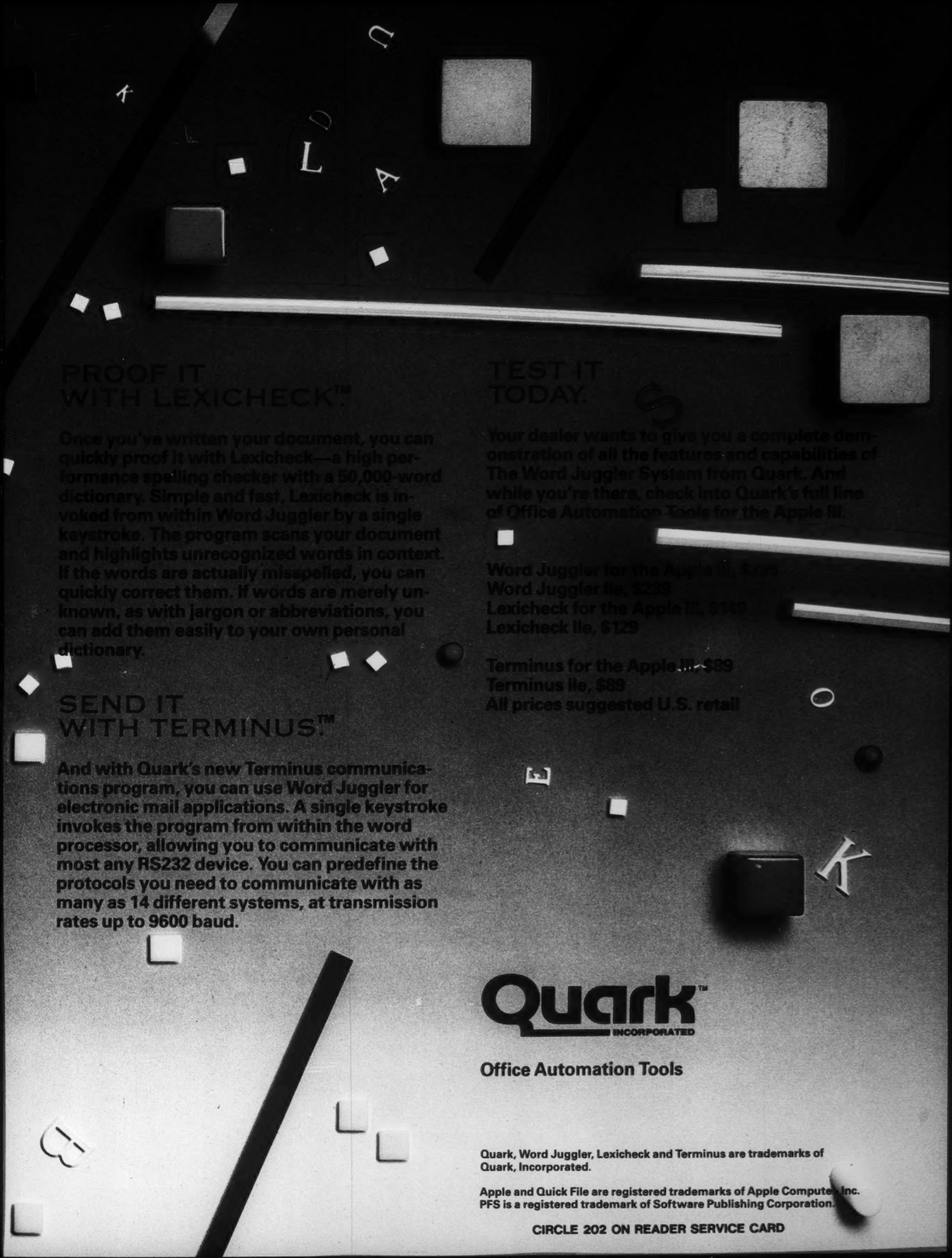

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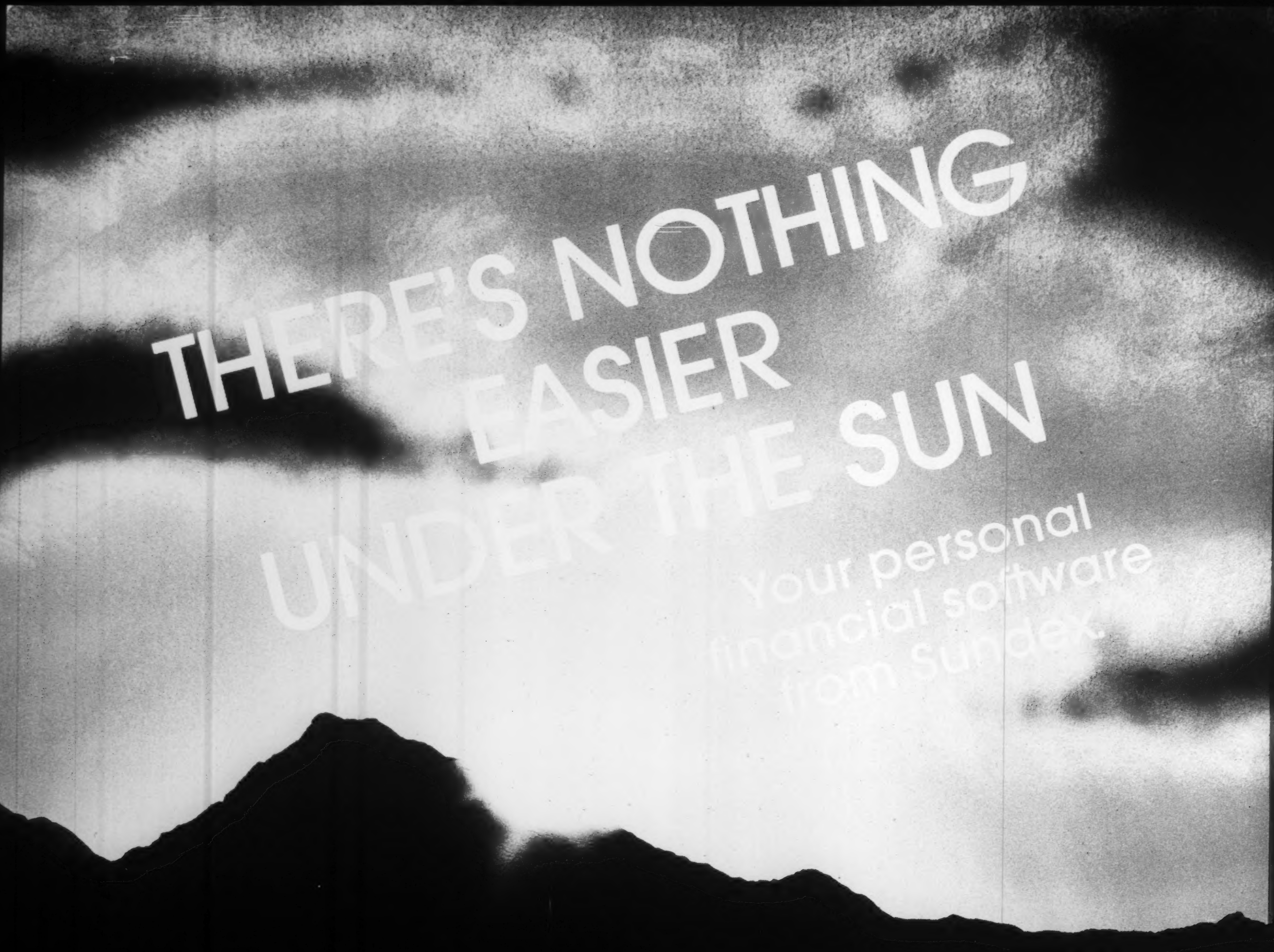

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Disk mode to set up a new file. Enter the filename and space is reserved on disk. You are immediately switched into the File mode, ready to enter text. The Pset command may be used to format your work. Enter the text as you would with a computer word processor, i.e. don't enter a return unless you wish to start a new paragraph or block of text.

Suppose you want to create a form. Instead of calling on a new program, enter the form headings and spaces for the fields, ending with a caret (∧), the character that delimits the field. After completing your form, use the Lock command to freeze the headings and fields. To use a form, enter the information requested for a field and press the tab. *Jack* jumps you over to the next field automatically.

Calculations are almost as easy. At the file menu, enter CALC and return. Type a definition such as PRICE or DISCOUNT, enter some spaces and end with a caret. To select a calculation formula, select the Foot mode. Let's say that the dscount will be 10% for all purchases. Enter DISCOUNT: .10 * PRICE. You have just set up your first calculation formula.

All of these modes can be combined. You can change a form into a form letter, have a form letter with calculations, or keep an inventory record with calculations. The versatility of *The Incredible Jack* makes it an impressive package.

Summary

The documentation is so-so. I think that the designers of *The Incredible Jack* got a little carried away and thought that the documentation should be as small as the disk. A tutorial is included. Although written in Pascal, a fast language, disk access can slow things down, as in the case of *Think Tank*. Also, transferring *Jack* files may be difficult unless you convert them into DOS format or have a Pascal-based communications program.

> ***The versatility of* The Incredible Jack *makes it an impressive package.***

Finally, it won't replace *WordStar* or *VisiCalc*. There are just some things that they can do better, easier, and quicker. And because it won't be the only program you use, it won't make using the Apple any easier. You will still have to learn different commands and different formats for each program. If you think that you will only be doing light word processing/database/spreadsheet/applications, *The Incredible Jack* may be the way to go.

Think Tank

Back in grade 3, Sister Amadea taught us all how to outline. Eight-year-olds are not noted for their organizational ability, and at that age, I was more interested in how the Baltimore Orioles were doing in their division. But, Sister worked at it, until we all could outline almost anything from a one-page book report to a plan for life. No matter what you do or plan to do, getting your priorities set up in an organized fashion is the best beginning. Until now, using a pad (or two) of paper and a supply of pencils was about the only way to get organized.

People do not think in a straight, organized path. We are not like computers. Intuition and insight enter into the process, as does the process of one thought causing us to remember another. So, you sit down with paper and pencil, or 3 x 5 cards, or some other organizational tool, writing down the first thoughts that come into your head. A few ideas come to mind. You write them down, and suddenly you are off on a tangent. Or you have the plan all neatly written down, and you decide to change just one point...

Well, now it is a little bit easier to organize your thoughts. With *Think Tank*, described as an "idea processor," thinking, rethinking, planning, organizing, and delegating jobs can be made a little easier. Really just an outline generator, *Think Tank* tries to make outlining as easy as word processing. By breaking down the physical barriers such as a full note-pad, blunt pencils, etc., *Think Tank* allows you to flow with the thoughts, cleaning them up later. Since it runs on your computer, erasing something you don't like is just a simple keystroke. The idea behind this product is that the easier it is to process ideas, the quicker and more effortlessly those ideas will come.

> **Think Tank *tries to make outlining as easy as word processing.***

Using Think Tank

Although the package looks frightening, working with *Think Tank* is easy. All you need to do is enter your thoughts into

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your Apple. Entries can be in complete sentences, fragments, paragraphs, or cryptic notes. Each entry can be indented, depending upon its importance in your overall scheme.

Again, thinking in a straight-line, organized fashion isn't necessary. Just put down your ideas and organize them later. One idea becomes a heading. Expanding on that heading forms a paragraph. You think of something that branches off from the paragraph, and you form a sub-heading, and so on and so on. New information or a change of mind is easily accommodated.

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SOFTWARE PROFILE

Name: Think Tank

Type: Outline generator

System: 64K Apple, 80-column extended memory card, 2 drives

Format: Disk

Language: Pascal

Summary: A great "brainstorming" tool. Very easy to use.

Price: $150

Manufacturer:
Living Videotext, Inc.
450 San Antonio Rd. Suite 56
Palo Alto, CA 94306

> ***Think Tank will not replace a list of "Things to do on Saturday."***

After entering an idea, edit it, add to it, or change its importance by moving it around. Don't worry about its placement too much. After all, you don't want to stifle your creativity. Just let the ideas flow onto the screen, taking shape and building upon themselves. Anything can be added anywhere. Ideas that aren't needed can be swept away easily. Indent a heading or an entire paragraph to give it added importance. Scan through your outline to add or delete what you wish.

The commands used are very simple and divided into four main groups. Each command is connected to another command, much like tree branches connected to a tree trunk. Moving the cursor over a command causes a brief explanation of that command to be displayed.

Want to see just the main headings of your outline? Enter CONTRACT and only main headings are shown. Enter EXPAND to get a look at more parts of the outline.

Printing is easily done after setting certain parameters such as slot number, page length, and lines per page. You can print out a full outline or a contracted one, having only those categories you want printed.

Although the program is written in Pascal, *Think Tank* files can be translated into DOS text files with a utility that is provided. Since so many people use DOS based word processors, this is a welcome feature. You can merge a *Think Tank* outline into an *Apple Writer* or other Apple word processor, or send them over a modem with a DOS based telecommunications program.

Documentation

The documentation for *Think Tank* looks frightening. The thick, spiral bound manual made me think that learning to use this software was just not worth it. The manual is very well done. A tutorial, reference section, good technical information, glossary, and a "refresher" section for old users of *Think Tank* make this one of the best documentation guides I have seen.

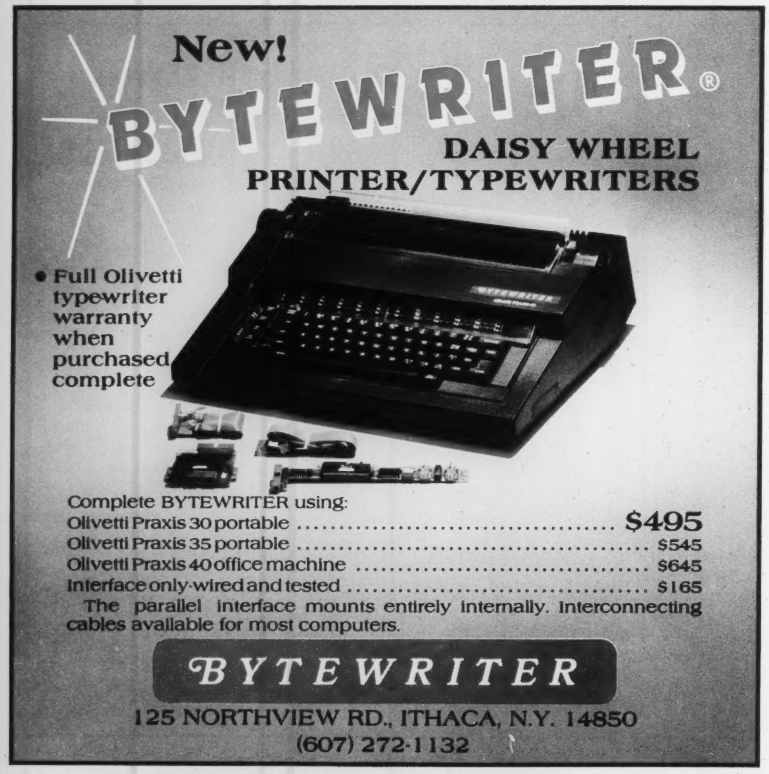
Although there is a great deal of information presented, it is done in such a way that it didn't bore me. Finally, a truly useful reference card is included. Nothing on the card is left to chance. *All* possible commands are covered, including when to use them.

Summary

Think Tank isn't for everyone. It does have its drawbacks. Since it frequently accesses the disk, it can be slow. Also, the paragraph buffer of 2K may seem too small for some people, though I didn't have a problem with it.

The hardware requirements will cut out many buyers. Two disk drives, the Apple 80-column extended memory card, and a printer are needed. With computers entering the schoolhouse, *Think Tank* seems to be a natural choice. Unfortunately, many schools do not have the necessary equipment.

Of course, *Think Tank* will not replace a list of "Things to do on Saturday." It may not be ideally suited for keeping a list of references or phone numbers. Index cards and little black books are just fine for those uses. But *Think Tank* may be useful in planning out long range or complicated projects. For writers, students—even eight-year olds—*Think Tank* will be a great help. ☐



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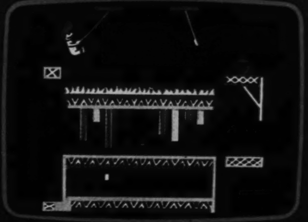

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Zorlof II — Word Processor Extraordinare

C. A. Johnson

I had seen the full page advertisement for *Zorlof* several times, but had not paid any attention to it. I am interested in games, but have little time for them, so I am not attracted to game advertisements. Only when a friend called my attention to it did I realize that *Zorlof* is not a game, but a word processor and a darned good one.

The specifications recounted in the ad were impressive. As a writer, I am always looking for tools that make the job of writing a little easier.

However, I expect programs to have names that suggest their purpose, e.g., *Scripsit, Word Star*, and *Lazy Writer* for word processing programs. Programs with names that could have been formed from a spoonful of alphabet soup are usually games. I believe it is a mistake to name a serious program that way. For that reason, *Zorlof II* could have escaped me forever.

Most word processing programs work much the same way. The specific details (syntax) of how to make them perform their functions differ somewhat, but the big difference is in what compromises have been made. The margin of difference is in which of the full word processing functions have been left out. Most word processors written for microcomputers make some significant compromises, but *Zorlof II* leaves out very little.

Page Preview

One of the first features of *Zorlof* to catch my attention was the ability to display the text on the screen as it will appear on the printed page. In the past, I have wasted many reams of paper to get the format I wanted for a particular document. With *Zorlof* you enter View mode and you can see the entire text without the control characters and with the page breaks and page numbers just as the final copy will look.

Zorlof has all of the basic features you expect in a word processor—word wrap, print formatting (including left and/or right justification and centering), search and replace (single and global), as well as the ability to copy and rearrange text. In addition, it underlines, prints bold, subscripts, and superscripts, and adds another document to the one in RAM. You can even insert a document into the body of the existing text from an external file or write out a portion of your document to a new disk file.

Zorlof II *leaves out very little.*

When *Zorlof* is loaded, two status lines are displayed at the top of the screen. The first line contains the name of the file with which you are working and the width of the text line. In addition, the top status line displays the number of words and the number of lines in the document, as well as the amount of free RAM. When you prepare a manuscript, you can tell at a glance how many words you have written and how much space is left in memory—definitely a premium feature. The status lines remain on the screen while you are working with the document. The second line contains two fields that are used in search and replace operations.

Unusual Features

Several unusual capabilities are included. For example, *Zorlof* supports more than 50 different printers (18 printer drivers) and allows the special printing features of each to be imbedded in the text. This allows you to mix different print modes on the same line. For example, you can mix double-wide letters with normal and emphasized characters and italics in the same body of text. It also supports proportional spacing directly on dot matrix printers, as well as some daisy wheel printers, and right justifies at the same time, if you wish.

Headers and footers are defined separately for odd and even numbered pages: they can be the same or different; they can be turned off and new ones inserted at any time. The page number line is not

creative computing

SOFTWARE PROFILE

Name: Zorlof II

Type: Word processing

System: 32K TRS-80 Models I, III, and 4

Format: Disk

Language: Machine

Summary: Well designed, easy to use, provides on-screen printout preview.

Price: $69.95

Manufacturer:
Anitek Software Products
P.O. Box 1136
Melbourne, FL 32935

C. A. Johnson, 3619 Sugarhill Dr., San Antonio, TX 78230.

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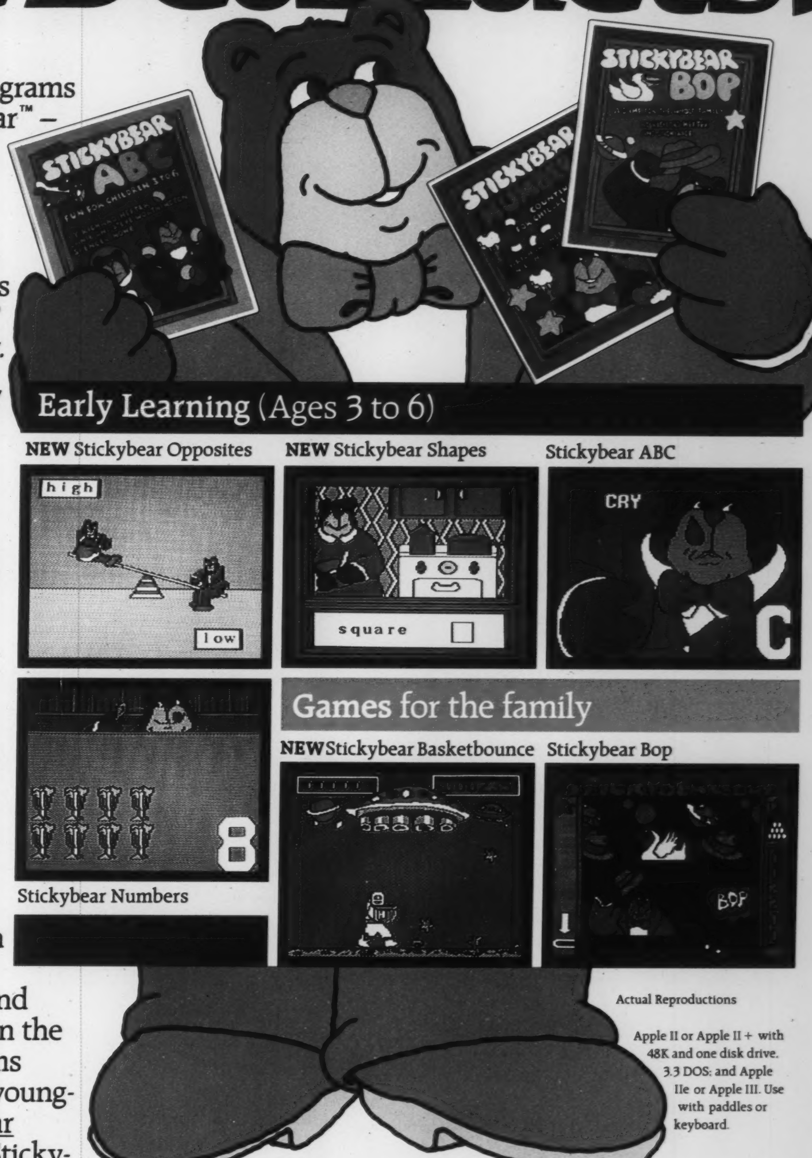

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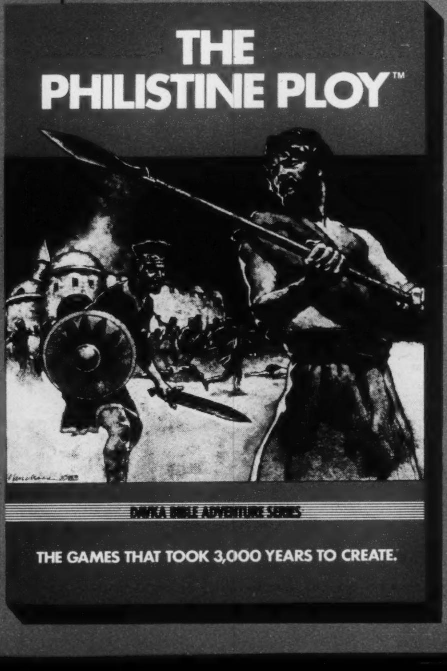
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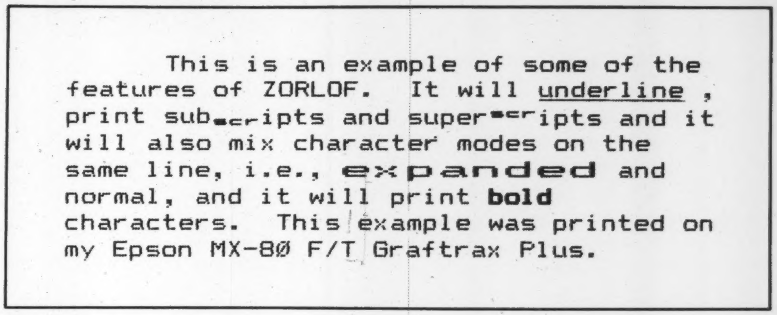


This is an example of some of the features of ZORLOF. It will underline , print sub$_{scr}$ipts and super^{scr}ipts and it will also mix character modes on the same line, i.e., expanded and normal, and it will print **bold** characters. This example was printed on my Epson MX-80 F/T Graftrax Plus.

Figure 1.

part of the header or footer, but is defined and located separately on the page.

Form Letters

A fundamental feature of *Zorlof* is the capability for personalized form letters. You can compose a letter, leaving out the parts that differ in each letter and flagging the place for them to be inserted. In a separate file, the addresses and texts to be inserted are developed. When the form letter is printed, it makes the proper insertions as designated in the form letter. It matches the flags in the letter with the field names in the form data file.

***I am very pleased with* Zorlof II.**

As I reviewed this feature, with its open format and unlimited number and size of fields in the form data file, it occurred to me that this capability could be used as a file management system. The number of record types is limited to the number of different characters on the keyboard, but few home data management requirements would exceed that.

I frequently write a manuscript in random pieces and assemble it later, adding the necessary text to link the pieces. *Zorlof* not only provides the capability to chainload files, but also provides the capability to save any portion of the text to disk as a separate document. Since I often include portions of the same text in several manuscripts, this capability is a special plus.

Another very handy feature is the ability to display the directory, select a file from the directory by moving the cursor to the directory entry, and give the load command. Files can be killed in much the same way to make space for the text in RAM. There is a safeguard in killing files and deleting blocks of text. These actions must be done twice before they are executed.

Full Screen Editing

As a bonus to programmers, *Zorlof* supports full screen editing of EDTASM and Basic files, including automatic renumbering. If you have not programmed with a full screen editor, you may not realize the disadvantage of working with a line editor. In word processing mode, some of the keyboard characters have been modified for word processing use, but in editing EDTASM and Basic files, the important ones have been restored to their original form.

Zap-Processing

Another feature of special interest to programmers is the Zap-processing capability. Zap-processing allows you to read any file on a disk and modify it directly, using hexadecimal notation. With it you can patch machine language programs or recover damaged disk files which you could not otherwise read. The capability provided by this feature is available elsewhere as a stand-alone utility or as a part of an operating system. But to my knowledge, it has not been included as part of a word processing package. It is a very powerful tool.

The documentation is easy to read and reasonably complete. Once I had gone through the sample text and had deciphered the format commands, I had little difficulty learning to use *Zorlof*. Even after you have read the manual and think that you understand *Zorlof* completely, you should review the sample text and identify what each statement does.

A few things could benefit from some alternative examples. I made a number of wrong attempts when I tried to format page numbers at the top of the page and to start numbering on page 2. This is a common format; I am surprised that it was not used as the basic illustration.

Insertions

I am very pleased with *Zorlof II*. The only thing I do not like about it is the manner in which it handles insertions. To insert, you move the cursor to the point where you wish your new text to be inserted and press CLEAR-I (simultaneously). As you enter your insertion, the text spreads one character at a time to make room for the new character until the complete string has been inserted. You then take it out of insert mode with CLEAR-I.

As you type, your new text blends in with the existing text. There is an open text command, but it lasts only for the existing line, then the insertion "catches up" at the end of the line and again blends with the existing text. You do not have the ability to enter several lines of text to see the end of your entry without the distraction of the following text, without a lot of format manipulation, which in itself is distracting. I would rather have the text open up and then close it when the insert is completed. However, I expect that I will soon adjust to *Zorlof*.

Zorlof II *is a superior word processing system.*

Zorlof II is a superior word processing system unsurpassed in the capabilities it provides for such a modest price. It runs on TRS-80 Models I, III, and 4. It requires 32K memory, one disk drive, a line printer (either serial or parallel), and lower case modification (Model I only). Apparently it will work with a number of operating systems. (I used TRSDOS and NEWDOS.) ☐

"I think we've abdicated too much control to our machines!"

Much More Than A Spelling Checker

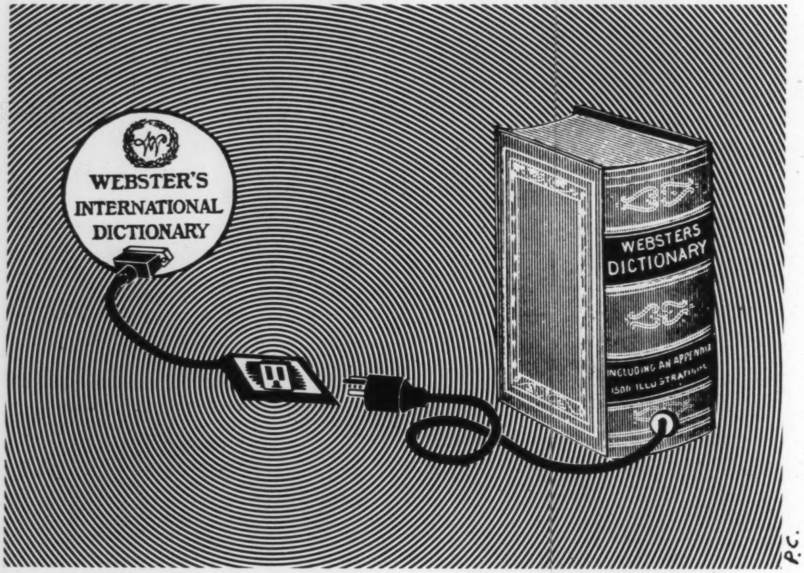
Dan Robinson

I have always been a fast typist. But I am not a master of the touch system, and sometimes I am not very accurate. Sometimes it looks as though I have used my toes, nose, and elbows on the keyboard, and every once in a while my typos slip into the final copy. My errors often appear as misspelled words that make me look like a kindergarten dropout; and I have found in rushed notes to non-computerists that jargon words like *ROM* and *byte* have crept in. Clearly, I need help.

The most helpful program I have found is *Electric Webster*. After looking at nine proofreading programs, I have settled on *Webster* to keep my final copies accurate and to disguise my precocious senility.

Like a shiny new car, *Webster* comes in a basic model at a reasonable price in CP/M, TRS-80 Model I/III, and PC DOS versions. If you want to go first class, there are options to correct errors *Webster* finds, hyphenate your text, check your document for proper grammar and style, and integrate *Webster* with your favorite word processing program.

Electric Webster boasts a 50,000-word dictionary with virtually unlimited expansion capability. It is a highly enhanced version of the earlier *Microproof* dictionary program; but unlike *Microproof, Webster* uses a literal dictionary so that exception-to-the-rule prefixes and suffixes will not slip by. Written by Cornucopia Software's Phil Manfield, the program requires 32K. It may be used with a single disk drive with some disk swapping, but works best on a two-drive, double-density system. Using it with all the options integrated into your word processor, a typical session would go like this:



Spelling

After your document has been typed, pressing a control key in conjunction with another begins the proofing process. *Electric Webster* fires up, storing your file on disk and providing you with a word count. It discards duplicates and displays the number of unique words. The document is compared to the 50,000-word dictionary as well as your own word list and the mismatches are presented on the screen.

Next, each word is presented along with a selection menu for your choice of action (see Figure 1). If the error is obvious, such as a missing space in *sparetire,* you can type the correction once, and it will ultimately be replaced as many times as it appears in your document. If it is a word that is not in the dictionary, such as Mr. *Grunch,* you can choose to leave it alone or add it to the dictionary if there will be many letters to Mr. Grunch in the future.

creative computing

SOFTWARE PROFILE

Name: Electric Webster
Type: Proofreading program
System: TRS-80 Mod I/III, 32K
Also available for PC DOS
or CP/M based systems.
Format: Disk
Language: Machine
Summary: Easy to use spelling and
grammar checker. An aid
to the serious writer.
Price: $149.95
Manufacturer:
Cornucopia Software
P.O. Box 5028
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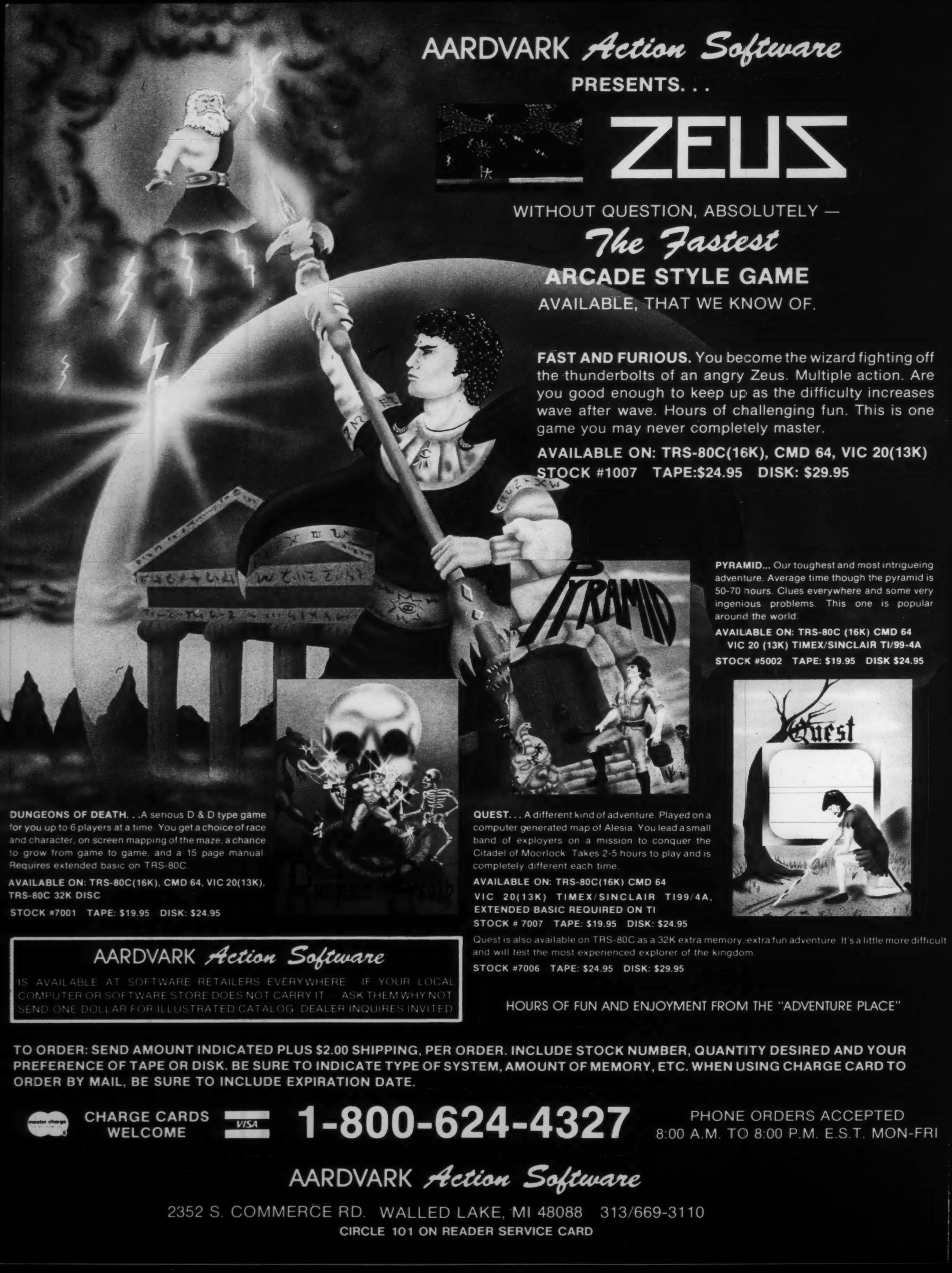

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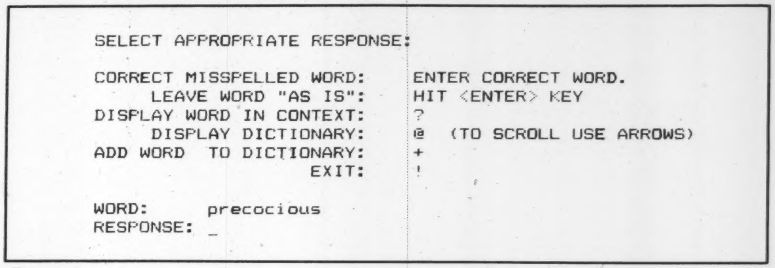
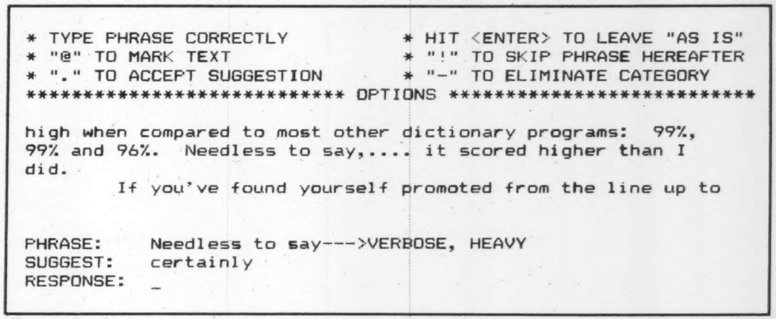


```
SELECT APPROPRIATE RESPONSE:

CORRECT MISSPELLED WORD:     ENTER CORRECT WORD.
     LEAVE WORD "AS IS":     HIT <ENTER> KEY
DISPLAY WORD IN CONTEXT:     ?
     DISPLAY DICTIONARY:     @  (TO SCROLL USE ARROWS)
ADD WORD  TO DICTIONARY:     +
                   EXIT:     !

WORD:      precocious
RESPONSE:  _
```

Figure 1.



```
* TYPE PHRASE CORRECTLY            * HIT <ENTER> TO LEAVE "AS IS"
* "@" TO MARK TEXT                 * "!" TO SKIP PHRASE HEREAFTER
* "." TO ACCEPT SUGGESTION         * "-" TO ELIMINATE CATEGORY
************************** OPTIONS **************************

high when compared to most other dictionary programs:  99%,
99% and 96%.  Needless to say,.... it scored higher than I
did.
        If you've found yourself promoted from the line up to


PHRASE:    Needless to say--->VERBOSE, HEAVY
SUGGEST:   certainly
RESPONSE:  _
```

Figure 2.

If you are not sure how the word was used, you can command *Webster* to show the word in context and defer your decision to the end of the session. For example, if you were inviting someone at Palm Springs to have dessert on the desert, you would have to see how the word was used to know if it was correct.

The main choice is to display the dictionary. *Webster* will show a list of words with a question mark where your word would appear alphabetically. The dictionary can be scrolled up or down with repeating arrow keys at a speed of your choice, appearing all uppercase in one direction and all lowercase in the other to keep you from getting lost. If you find the correct spelling, you don't even have to key in the word: by striking the period key, the scrolled-to word is accepted as the replacement.

When you have finished the session, your corrected words will replace the errors wherever they appear in your document. The corrections will follow the capitalization of the words they replace: all upper- or lowercase or first letter capitalized.

Hyphenation

In the meantime, conditional hyphens have been inserted in your text. If the word must be broken to fit on the current line, it will break at the conditional location, a hyphen will be printed, and the rest of the word will appear on the following line.

When you configure the hyphenation program, you select the minimum word length for conditional hyphens. You set the minimum acceptable segment size to appear at the end or beginning of a line, and decide whether single letter syllables can be hyphenated before and after or only after the syllable.

The grammar feature not only displays errors, but also offers suggestions.

Grammar

Before the corrections are actually written to disk, you have the option of grammar checking. Actually, this feature goes beyond what Mrs. Mullberry taught at P.S. 42, for some 23 categories of style may be checked.

The grammar feature not only displays errors, but also offers suggestions. If you have used *lots of, Webster* will offer *many* as an alternative. You can leave the phrase as it appears, type your own correction, or merely type a period if you are satisfied with the suggestion. Your other options are to mark the phrase for later repair work, skip that phrase in the remainder of the document, or eliminate the entire error category for the rest of the session.

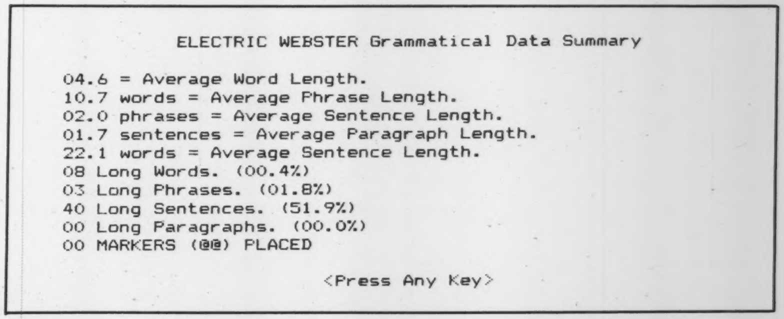
Among the 23 categories are checks for two spaces at the end of a sentence, sentences without periods, capitalization errors, mistakes in parentheses and quotation marks, and miscellaneous punctuation errors. Repeated words and double negatives are checked.

The program also identifies words and phrases that style manuals recommend avoiding (see Figure 2). These include awkward, imprecise, obsolete, slang, trite, or verbose words and phrases. *Webster* also flags homonyms: words which sound the same but have different meanings. As always, an alternative is provided along with enough of a definition to enable you to choose the proper word.

Webster also looks for words and phrases in a user-defined category— a good way to ensure that professional or industry jargon doesn't leak through to the uncomprehending outside world.

The grammar feature flags long words, phrases, sentences, and paragraphs according to the values you set in configuring the program.

At the end of the grammar session, you see a summary that provides clues as to the overall readability of your document. The summary gives the average word length, number of words in the average phrase and sentence, number of phrases in the average sentence, and number of sentences in the average paragraph. The number and percentages of long words, phrases, sentences, and paragraphs is provided as well as the



```
              ELECTRIC WEBSTER Grammatical Data Summary

04.6 = Average Word Length.
10.7 words = Average Phrase Length.
02.0 phrases = Average Sentence Length.
01.7 sentences = Average Paragraph Length.
22.1 words = Average Sentence Length.
08 Long Words. (00.4%)
03 Long Phrases. (01.8%)
40 Long Sentences. (51.9%)
00 Long Paragraphs. (00.0%)
00 MARKERS (@@) PLACED

                                   <Press Any Key>
```

Figure 3.

number of markers placed in the text. (See Figure 3.)

At the end of the grammar session, the corrections are made, and you find yourself back in your word processor with the completed text on the screen ready to be printed.

Without the options, *Electric Webster* operates as a stand-alone program. It reads your text file and sends the list of mismatches to disk or printer for later correction via the search-and-replace function of your word processor. Separate utilities are provided to expand and edit the spelling list.

Webster will process a 1000-word text file in about 1¼ minutes for spelling errors, and somewhat longer for grammar checking, depending on your writing style.

The expandable user dictionary, like the main one, is compressed so that about 500 words occupy only one gran of disk space. Since all of the dictionaries don't have to be on line at one time, the user dictionary could fill an entire disk to give *Webster* an awesome vocabulary.

The Grammar module has utilities to add phrases to be checked together with your own suggested replacements, each assigned to the appropriate grammar category. The files will be alphabetized and integrated into the program files.

> ***Writers of narrow-column newsletters will find the automatic hyphenation a big help.***

With the hyphenation option, you can instruct *Webster* where to place conditional hyphens in the words you add to the dictionary.

Documentation

The newly revised documentation for the package is thorough and easy to understand. It consists of 77 full-sized pages to help you set up your files and become familiar with features while following along with the sample file provided on the disk.

I have tested *Webster* with Lincoln's Gettysburg Address; Dr. Thomas Pollock's list of "The Hundred Words Most Frequently Misspelled;" and his list of "The Next 550 Words Most Frequently Misspelled." *Webster* had most of the words already in its dictionary and scored high when compared to most other dictionary programs: 99%, 99%, and 96%. It certainly scored higher than I did.

If you have found yourself promoted from the line to the paper-pushing level; are foreign born and find our upside-down English troublesome; or if English 101 is where you caught up on your sleep, then you will appreciate the grammar option.

Writers of narrow-column newsletters will find the automatic hyphenation a big help; and if your spelling is less than perfect or if you have ever missed a typo, then you will love this fast and accurate dictionary program. ☐

Price List

Electric Webster	$89.95
Correcting Option	$60.00
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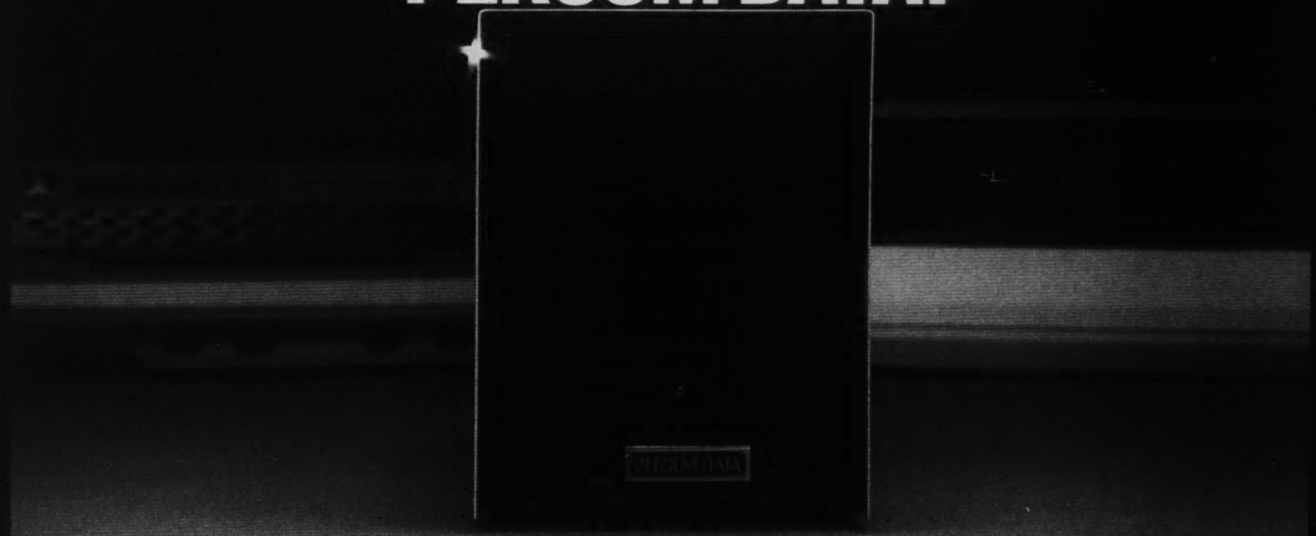

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Can A Great Game Maker Find Success In The Educational Market?

Hi-Res Learning Games

Betsy Staples

Sierra On-Line, one of the leading publishers of Apple games, has recently entered the educational software market with a series of Hi-Res Learning Games.

The graphics in all three programs are outstanding, and we detected the skill of master game designers as we watched the children on our test panel become riveted to the computer screen. The On-Line packages also offer a feature that we have found lacking in educational packages of many other manufacturers: educational objectives. By reading the objectives or "learning features" on the box, a parent or teacher can determine whether the game teaches skills his child or class needs to learn.

Each package comes with a two-page Parent Guide that offers a brief description of the game(s) on the disk and a list of control keys, of which there are only four.

Let's begin our examination of Hi-Res Learning Games with an outstanding package for pre-schoolers.

Learning With Leeper

Learning With Leeper offers four games for children aged three to six. We tried to determine which of the four was the favorite of our testers, but they refused to commit themselves, and we were unable

creative computing

SOFTWARE PROFILE

Name: Learning With Leeper

Type: Educational game

System: 48K Apple, 16K Atari; joystick

Format: Disk/cartridge

Summary: Excellent learning game for pre-schoolers.

Price: $34.95

Manufacturer:
Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614

Learning With Leeper (Dog Count)

Learning With Leeper Menu

to pick a winner based on the frequency of their choices.

Among the most appealing features of *Learning With Leeper* is that after the disk has been booted, the child can play as long as he wants without assistance. All menu choices and game maneuvers are accomplished with the joystick, and a small creature named Leeper provides the demonstrations that substitute for written instructions. There is nothing to read and no need to use the keyboard.

The program opens with the menu, which displays a pictorial representation of one game in each of the four corners of the screen. The child has only to move a picture of Leeper to one of the corners to choose his game.

Dog Count

In Dog Count, we see groups of bones—one, two, three, four, and five—lined up at the right of the screen. Each group has the appropriate Arabic numeral displayed alongside. For each round of the game, a different number of Snoopy-type dogs appears at the left of the screen. The child's task is to select the group of bones that will feed the number of dogs on the screen.

After he makes his selection, the bones move to the center of the screen and the dogs walk out one-at-a-time and flop down contentedly to enjoy their bones. The child then enjoys a quick display of swirling smiley faces, and a smiley face is added to his collection on the game board.

If the child has selected too few bones, the boneless dog(s) yaps plaintively after the distribution is complete. If there are too many bones, the left over bone(s) squeaks.

Unfortunately, the yapping dog is just a little too cute, and we found that, as is so often the case, the response for an incorrect answer was almost as rewarding as the response for the correct answer. Children occasionally chose the incorrect answer deliberately. We also felt that children at the higher end of the recommended age range could easily handle higher numbers, and we would have liked to see this extension of the game.

Overall, Dog Count earns a high rating for both playability and educational value.

Balloon Pop

The second game on the disk is Balloon Pop, a shape matching game. The object is to pick the one of four shapes or letters at the bottom of the screen that matches the shape or letter displayed on the right side of the screen. To do this, the child uses the joystick to maneuver a balloon from which a hook is suspended.

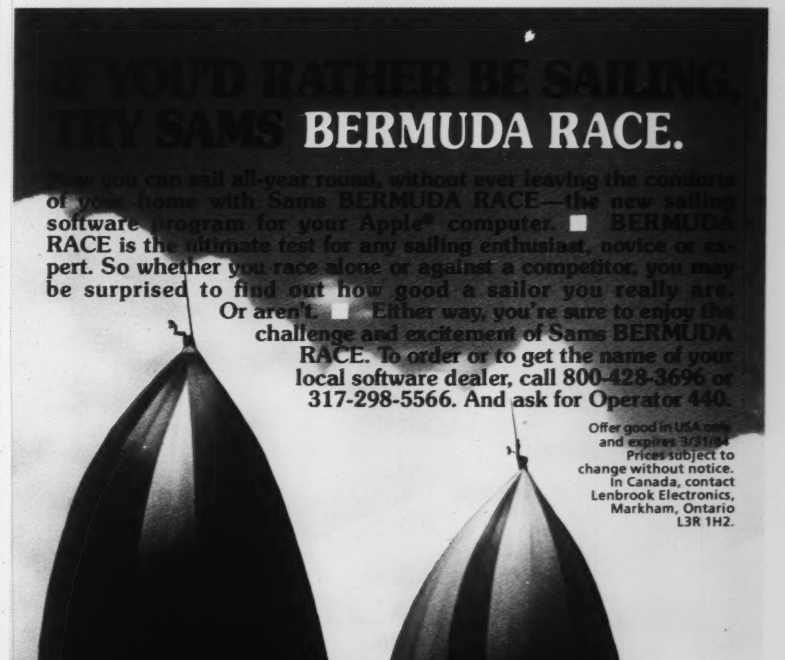
If he chooses the correct shape, he is rewarded with a cute tune and a display of popping balloons. If he chooses incorrectly, his balloon releases the shape which drops back into its place at the bottom of the screen. After he has successfully matched all four shapes, he gets to play a simple game in which he pops balloons. When he succeeds in popping ten balloons, the next round of the matching game appears on the screen.

We found some of the shapes quite difficult to distinguish from one another, but the children did quite well with them. Balloon Pop, too, earns a high rating.

Leap Frog

In Leap Frog, the child must guide a cute little frog through a maze. The first maze is very simple, and the child must negotiate it "with skill" before he can progress to another. "With skill" is not defined in the Parent Guide.

If he completes the maze with skill, the child gets to watch a game of leap frog between Leeper and the frog. After they have made one trip across the screen, a caterpillar appears and chases them back.



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The second and subsequent mazes are more complex, even though they offer more than one possible correct path. The game is further complicated by the presence of the malevolent caterpillar which is set loose in the maze with the frog.

Ironically, our children found the second level mazes much easier to negotiate than the first qualifying maze. One child was, however, quite disturbed by the caterpillar, and became panicky when it appeared about to overtake his frog in the maze.

The children enjoyed Leap Frog a great deal, but were frustrated by having to complete the qualifying maze each time. Perhaps one qualifying maze per session with the disk would make the game more appealing.

Screen Painting

The final game on the disk, Screen Painting, is not really a game at all but, as the name implies, an artistic exercise.

In each corner of the screen is a pot of paint—red, green, blue, or purple. The child uses the joystick to move the paintbrush around the screen, creating a drawing. To change colors, he has only to pass the brush through a different color paint.

Screen Painting was more popular with the younger children on our panel than the older ones. None of the children seemed inclined to imitate the representational art demonstrated by Leeper; they apparently preferred more contemporary abstract expressions.

Summary

We found that although our youngest tester (barely three years old) understood the concepts involved in the games and could frequently do the counting and identify matches, she could not control the joystick well enough to play the game alone. We also discovered a new form of hardware abuse, joystick jamming. The Kraft joystick we were using held up well, but parents would do well to give special thought to durability when choosing a joystick that will be used by preschoolers.

The cleverness and thoughtfulness of On-Line's programmers is astonishing; Leeper demonstrates each game only once per session. This seems like a small point until you consider the attention span of a pre-schooler and attempt to estimate how many times he will switch games in a single sitting.

All in all, we think *Learning With Leeper* is an excellent package. The games are attractive to children, hold their interest, and teach some useful skills. The father of one five-year-old boy who tested the program told us that *Learning With Leeper* was an extremely positive experience for his son who had never used a computer before and hadn't talked of much else for over a week.

Dragon's Keep

Dragon's Keep is an adventure-type game for children aged "seven and up." The Parent Guide tells us that it "is designed to help your child develop skills in reading comprehension and map reading."

The adventure takes place in and around a small home in suburbia. The object of the game is to free 16 animals that are being held captive by an unfriendly dragon.

Each scene is depicted in splendid hi-res graphics. To act, the player must read the two or three sentences printed at the bottom of the screen and choose one by pressing RETURN. He moves the cursor by pressing the spacebar.

Along with the disk and Parent Guide, you get a poster-size map of the house and environs, 16 animal stickers, and a compass sticker which you are advised to place "on the monitor near the screen." As the child discovers animals, he can place the appropriate sticker on the labeled circles on the map.

The dragon is at large and periodically appears superimposed on the hi-res scene. In theory, he is supposed to hinder the release of the animals, but in practice, he has very little effect other than to slow down game play as his hi-res image spreads out on the screen pixel-by-pixel. The dragon becomes tiresome very quickly.

The reading level of the action choices is second grade, and the game is delightfully free of arbitrary surprises—sudden death, endless mazes, lost treasures, etc. A modicum of common sense and an orderly approach to the exploration will lead to success.

The map is intricate enough and the hiding places of the animals clever enough to be challenging even for players in the "and up" category. We did, however, get tired of waiting for the hi-res pictures to materialize.

Our only other complaint is the method of keyboard control. We found that players had trouble remembering whether to press RETURN or the spacebar to move

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SOFTWARE PROFILE

Name: Dragon's Keep

Type: Educational adventure game

System: 48K Apple

Format: Disk

Summary: Hi-res adventure with educational objectives for ages 7 and up.

Price: $29.95

Manufacturer:
Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614

Dragon's Keep

Troll's Tale

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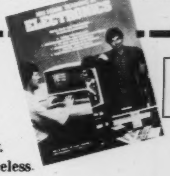

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Hi-Res Games, continued...

the cursor; all too often, the wrong choice was made, and the player found himself doing something other than what he wanted to do. It seems that a player who can read at the second grade level ought to be able to recognize the number keys and that a better scheme would have been to have him choose by pressing the number corresponding to his choice (the choices are already numbered).

We like *Dragon's Keep*. It uses a popular game format to develop skills rather than just drill them, and although it seems to be designed for home use, it could certainly be useful in the classroom as a cooperative venture.

Troll's Tale

Troll's Tale is very similar to *Dragon's Keep*. It is for slightly older children—ages eight and up—and offers practice in map making, identifying details, making inferences, predicting outcomes, and drawing conclusions. Reading is at the third grade level.

The game takes place in the subterranean kingdom of the Dwarf King Mark. A wicked troll has stolen 16 treasures from King Mark and hidden them in caves, cottages, tree trunks, and other unlikely places. The object of the game is to recover the treasures for the king.

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SOFTWARE PROFILE

Name: Troll's Tale
Type: Educational adventure game
System: 48K Apple
Format: Disk
Summary: Hi-res adventure with educational objectives for ages 8 and up.
Price: $29.95
Manufacturer:
Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614

This package includes a disk, Parent Guide, poster-size map, 16 treasure stickers, and a compass sticker. Many of the circles on the *Troll's Tale* map are unlabeled, so the mapping procedure is a bit more difficult than in *Dragon's Keep*.

Our criticisms of *Troll's Tale* are the same as our criticisms of *Dragon's Keep*: the appearance of the troll on a scene is tiresome and pointless, and the keyboard control could be improved.

Our endorsement is also similar: *Troll's Tale* is a good game. It seems to be effective in accomplishing the educational objectives it sets for itself, and it does so in an entertaining non-drill-oriented way. □

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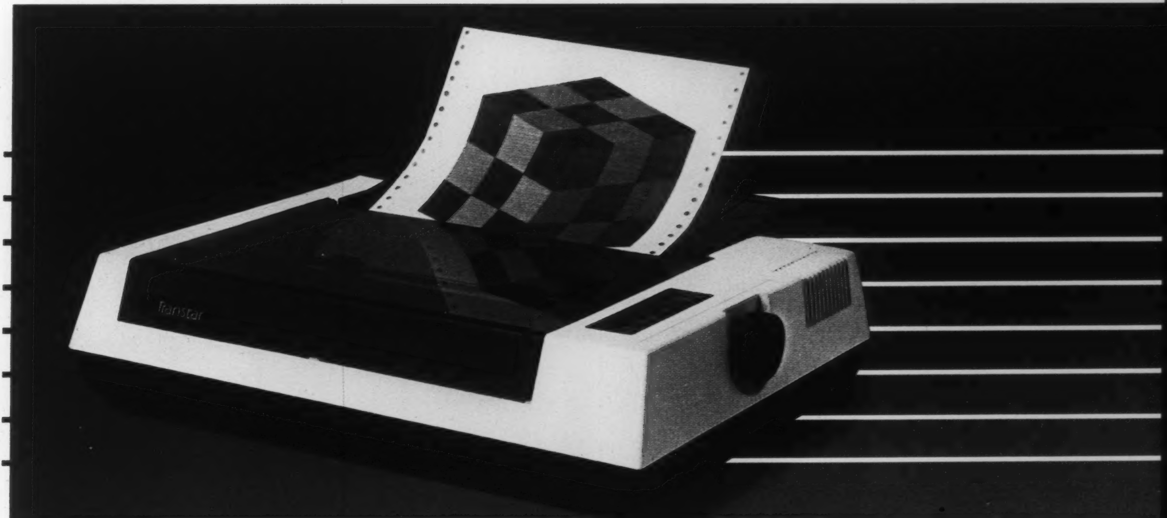

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Apple Games:
The Latest and Greatest

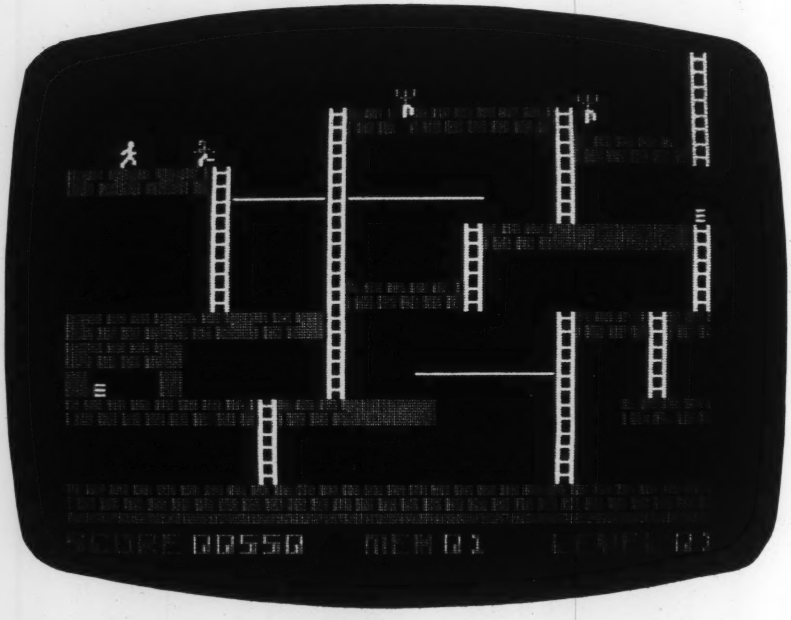
Steve Williams and Owen Linzmayer

The Apple continues to be the machine of choice for many serious gamers. For years, Apple game designers have been described as pushing the computer to its limits, but still they manage to produce better and more sophisticated games—complex arcade games, convoluted hi-res adventures, and imaginative combinations of the two. Here we take a look at some of the newest offerings for Apple gamers.

Lode Runner

Lode Runner is an action game system that simulates the mission of a galactic commando deep in enemy territory. The enemy, known as the Bungeling Empire, has stolen a fortune in gold from the player's peace-loving people. The player's objective is to enter the enemy's underground treasury and recover the gold.

The treasury consists of 150 elaborate screens that resemble somewhat the diggable floors and ladders of *Apple Panic*. *Lode Runner*, however, offers additional features that are uniquely its own, including undiggable floors, trap doors, and horizontal climbing bars.



Lode Runner

The player is an animated humanoid armed with a pistol that can blast away portions of the floor, leaving holes that refill approximately ten seconds later (at normal game speed). Blasting can be used to create an exit or to trap the Bungeling guards, who can be crushed if they fall in and are unable to escape in time. While contact with a guard usually means death for the commando, he can walk freely upon trapped guards as though they were part of the floor.

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Apple Games, continued...

Running, jumping, climbing, and avoiding enemy guards, the player must retrieve chests of gold scattered throughout the treasury. Recovering all of the gold in a scene causes a special ladder that leads to the next level to appear.

With 150 different screens each of which requires a different strategy to complete, *Lode Runner* offers a seemingly endless challenge. Even when played for hours on end, dozens of scenes still remain to be explored. Moreover, a strong addiction builds in struggling to reach new screens.

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SOFTWARE PROFILE

Name: Lode Runner
Type: Action
Author: Doug Smith
System: 48K Apple II+ and IIe
Format: Disk
Summary: A superb, 150-scene commando mission
Price: $34.95
Manufacturer:
Broderbund Software
1938 Fourth St.
San Rafael, CA 94901

This game requires more thought than the typical action game, especially at the higher levels. Some screens were so involved that I paused to examine them for nearly a minute before taking action.

The only weakness of this program is a minor one. At the start of every scene or after the player is killed, the video display slowly takes a circular form, closes in aperture to a central point, and then opens again. This action takes approximately ten seconds and soon becomes unpleasantly repetitive.

Lode Runner is not only a fascinating game but also a powerful game building utility. "Generator mode" allows players to create their own scenes. This involves moving the cursor to various screen positions and then designating what should occupy them. The process, which uses single keystrokes, is fast and easy to learn.

Lode Runner is demanding, addictive, flexible, and thought provoking. All in all, it is an outstanding game. *—SW*

The Quest

The island, a chunk of rock not a hundred yards offshore, jutted obliquely from the crashing sea. I waded closer, the water refreshing although cumbersome as it soaked through my chainmail and settled in my underquilts. The shape of the relic upon the island became clearer with every step. Reaching the base, I began to climb, scratching impatiently at the volcanic cinders. Finally I was at the summit and staring at what appeared to be a weather-beaten sign. From the faint scratches I discerned the message "Beware of Sharks."

"What sharks?" I thought to myself.

Turning once again to the sea, I noticed a dozen huge dorsal fins circling the island.

This was one situation I encountered in playing *The Quest*, a new graphic adventure by Penguin Software, a company long revered for its excellent graphics utilities. Set in medieval times of swords, sorcery, and dragon slaying, this game will appeal especially to those who enjoy fantasy role-playing games.

As King Galt's advisor, the player must accompany a huge swordsman named Gorn on a mission to slay a vengeful dragon that has been terrorizing people in neighboring provinces. The majority of the adventure is spent investigating the wilderness and caves of the kingdom to find clues and prepare for the ultimate battle.

The game follows commands such as "open chest," "tie rope," and "examine carpet," which may be combined in sentence form by using the conjunctions "and" or "then." Certain frequently used commands may be keyed with convenient, one-letter shorthand.

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SOFTWARE PROFILE

Name: The Quest
Type: Graphic adventure
Authors: Dallas Snell, Joe Toler, and Joel Ellis Rea
System: 48K Apple II, II+, and IIe
Format: Disk
Summary: Stunning graphics and entertaining plot
Price: $19.95
Manufacturer:
Penguin Software
830 4th Ave.
Geneva, IL 60134

This game uses exceptional graphics with stunning detail. Over two hundred locations are vividly depicted in colorful high resolution. Considerable time and effort must have been taken in preparing each scene. The player can toggle from graphics to text mode, where he can examine visible items, possible exits, and

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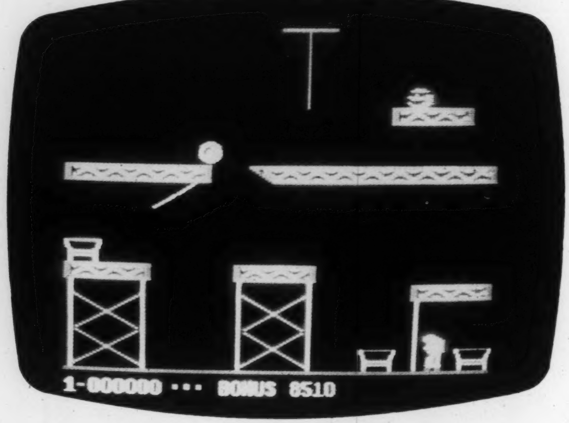
The Quest



Sammy Lightfoot

past instructions that have scrolled up the screen. A game in progress may be saved at any point.

The Quest offers features that many graphic adventures do not. For instance, it draws visible items on the screen and erases them after they are taken. A few of the scenes are active while the game awaits input; a cat prowls across a dungeon floor, for example. Moreover, when some items are examined, the game displays an additional hi-res picture of them.

There are sometimes two or even three ways to overcome obstacles in *The Quest*. This offers a a challenge even after the mission has been completed for the first time, which is by no means an easy task.

Priced under $20, this game is a great value. It is superior to many adventures costing twice as much, whether graphics or text oriented.

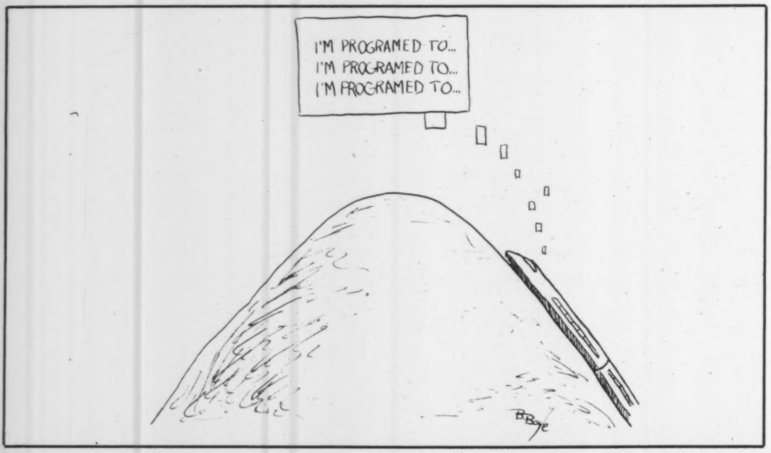
Remarkably outstanding in graphics, story, realism, and price, *The Quest* will be a sure favorite of any serious adventurer. *—SW*

Sammy Lightfoot

Sammy Lightfoot, an aspiring young acrobat with an electric red pompadour, stands calmly upon the platform under the big top. He is about to attempt the most difficult challenge of his career; treacherous chasms, shifting floors, pounding hammers, and a trapeze over flames are only a few of the obstacles that he will face. It will require all the timing and courage that he can muster.

Sammy Lightfoot is an action game in which the player must meet Sammy's challenge in three scenarios and at twelve levels of difficulty. After three scenes pass, the sequence repeats at the next higher difficulty level.

The first scene consists of four floor levels with three trampolines and two swinging ropes. Sammy must bounce to higher floors using trampolines, cross a chasm on a swinging rope, and avoid hazardous circus balls that tumble in his path.


I'M PROGRAMED TO...
I'M PROGRAMED TO...
I'M PROGRAMED TO...
B.Boye

creative computing
SOFTWARE PROFILE

Name: Sammy Lightfoot
Type: Action game
Author: Warren Schwader
System: 48K Apple II, II+, and IIe
Format: Disk
Summary: Outstanding action
Price: $38.00
Manufacturer:
Sierra On-Line, Inc.
Sierra On-Line Building
Coarsegold, CA 93614

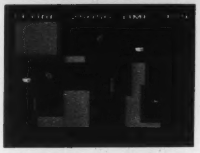
In the second scene, he must leap across disappearing platforms, travel atop plungers, and ride upon a flying carpet. Finally, in scene three, he faces a deadly puff ball, crashing hammers, and the trapeze over scorching flames. Frequently during the game he must avoid crazy pumpkins that scowl wickedly behind dark sunglasses.

Controlled with a joystick, Sammy jumps responsively with a push of the button and is easily directed left and right. The game can be played equally well with the Apple keyboard.

Sammy Lightfoot offers an enjoyable challenge and an addictive lure. The game advances in difficulty as the player improves, and the timely change of scenes holds the player's interest. I felt considerable satisfaction as I reached scenes at higher skill levels. Initially, I predicted that this game would be somewhat limited because it has only three main screen types. However, I soon found this assumption incorrect because new strategies are necessary to overcome the obstacles as they increase in difficulty.

This game uses imaginative, high-resolution graphics. Sammy's movements

WELCOME TO APSHAI. YOU'RE JUST IN TIME FOR LUNCH.



Boy, have you taken a wrong turn. One moment you're gathering treasure and the next you're being eyed like a side of beef.

You're in the Gateway to Apshai.™ The new cartridge version of the Computer Game of the Year,* Temple of Apshai.™

Gateway has eight levels. And over 400 dark, nasty chambers to explore. And because it's joystick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy. Is it treasure you're after? Or glory? You'll live longer if you're greedy, but slaying monsters racks up a higher score.

The Apshai series is the standard by which all other adventure games are judged. And novices will not survive.

They'll be eaten.

One player; Temple of Apshai, disk/cassette; Gateway to Apshai, cartridge, joystick control.

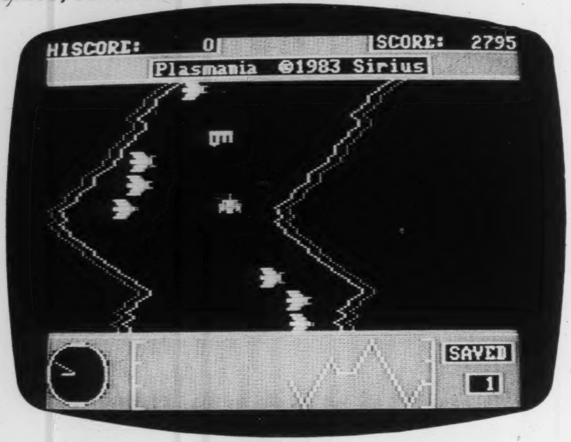
EPYX
Temple of Apshai
EPYX

EPYX
COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

*Game Manufacturers Association, 1981

CIRCLE 159 ON READER SERVICE CARD



Plasmania

are realistically animated in walking, jumping, and swinging. His electric hair spins wildly when he is in trouble. Moreover, each scene is preceded by a short, cheerful tune.

Simply stated, *Sammy Lightfoot* is an excellent game. It is creative, enjoyable, and addictive. Of all action games released this year for the Apple II, it is undoubtedly one of the best. *—SW*

Plasmania

Remember the movie *Fantastic Voyage*? In that film, several scientists were injected with a serum that shrunk them to microscopic size. After being placed in a similarly diminutive space vessel, they launched into a man's bloodstream and attempted to cure his illness.

Plasmania is an arcade game based on an idea similar to that of *Fantastic Voyage*. As pilot of an armed "sub," the player's objective is to fight his way through twisting veins and clear a blood clot at the patient's brain. This involves blasting away harmful bacteria, avoiding blood cells, and, if necessary, destroying defense cells.

Colliding with any of the micro-organisms, allowing bacteria to pass, bumping the vein walls, or killing benign cells weakens the already debilitated patient. Strength can be restored by blasting enzymes, thereby causing them to release healing agents.

Another opponent that the player must face is not a micro-organism. It is the heart monitor, a clock that ticks down as the patient loses strength. For a successful mission, the blood clot must be reached before time runs out.

With three levels of difficulty and two modes for game duration, *Plasmania* is a versatile game that will challenge players of virtually any ability. After a successful clearing of the clot (the mission repeats after completion) the organisms assume new arrangements within the vein, requiring the player to remain alert to shoot or avoid the correct ones.

This program sports good sound effects throughout the game, one of which is particularly noteworthy. At the start of the game, a realistic, simulated voice screams, "Sirius presents *Plasmania*!"

Controlled with a joystick, the sub "swims" cleanly and responsively through the hi-res vein, which is similar to the vertically winding landscape in *Caverns of Mars*. The keyboard may also be used, although it is somewhat clumsy.

It is difficult to find any major flaws in *Plasmania*, but for me it lacks that quality of addiction that would make it truly outstanding. Although the game varies slightly from phase to phase, each part (with the exception of the clot scene) resembles the others closely enough to suppress the excitement that one might feel in striving to reach a new and different level.

Nevertheless, *Plasmania* is of above average quality in all other respects. It is challenging, responsive, flexible, and a fine game overall. *—SW*

creative computing

SOFTWARE PROFILE

Name: Plasmania

Type: Arcade action

Authors: David Lubar and Lewis Geer

System: 48K Apple II

Format: Disk

Summary: Challenging, creative game

Price: $34.95

Manufacturer:
Sirius Software
10364 Rockingham Dr.
Sacramento, CA 95827

Reach for the Stars

My home planet, a primary class satellite in the Rigel star system, shimmered like a jewel before the solar debris. Long ago and when my race lived solely upon this star, the people selected me to lead them. Since then we have prospered and become a wealthy, powerful empire. Today my territory stretches through light years of space and encompasses nearly two dozen Rigels.

Countless lives rest in my hands, as does my mighty starfleet, which has grown from a motley collection of vessels to a fighting force that can crush entire planets beneath its heels. Presently, though, most of the fleet is away on campaign, and Rigel itself, the jewel where my dreams began, is under siege. I realize that this planet is now little more than a speck in my empire, but nevertheless, I cannot let my homeland fall!

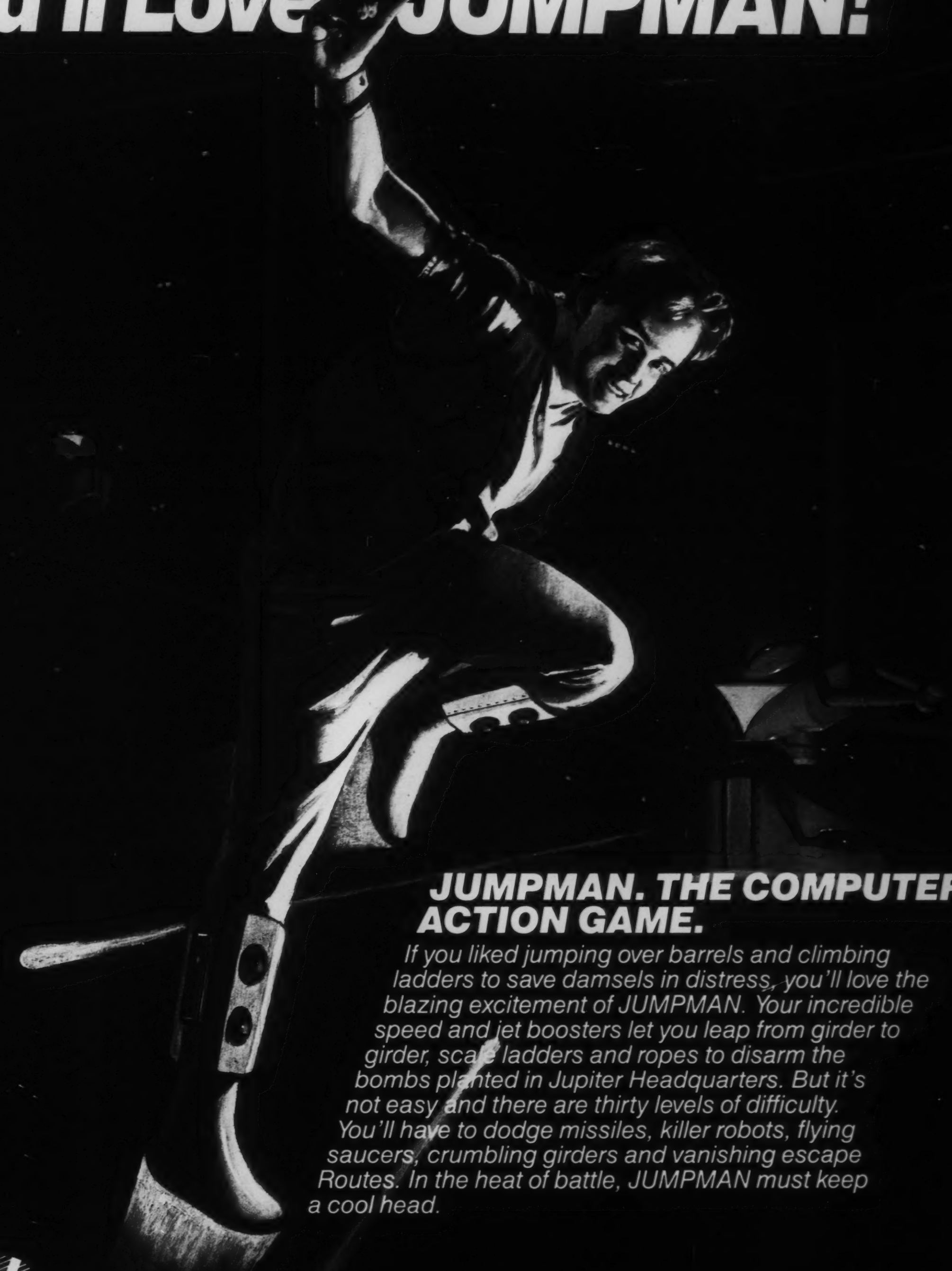
In *Reach for the Stars*, a strategic simulation of colonization, expansion, and conflict in a hypothetical galaxy, the player's job is to help me defend my planet. Each player must lead his people in exploring star systems, colonizing the most promising ones, and protecting them with a fleet of starships. In addition, a player may launch attacks against his opponents and attempt to conquer or destroy their territory.

Before play begins, each of the players must be designated as either human or computer controlled. A maximum of four humans may play; the remaining seats, if any, are taken and played by the Apple. This option allows solitaire as well as group play. A game can last from three to 30 hours and may be saved at any point.

The "galaxy" used in the game is represented in hi-resolution graphics and covers an extensive area of space including 54 star systems, each of which may contain up to three planets. Having their characteristics randomly determined every game, planets are classified in four main categories which describe the fitness of their environment for possible colonization: primary, secondary, tertiary, and hostile. Each planet is also rated for the maximum population, industrial capacity, and social level that it can support.

The combination of the ratings of a planet determines its productivity level and therefore the number of "resource points" it can produce. Resource points, credits which represent manpower and industry, may be allotted to the improvement of planetary characteristics, construction of planet defense systems, population service (food and necessities), technological advancement, and star fleet construction. Six types of ships may be built including explorers, transports, and starships (battle cruisers) of quality deter-

If You Liked Donkey Kong, You'll Love JUMPMAN!



JUMPMAN. THE COMPUTER ACTION GAME.

If you liked jumping over barrels and climbing ladders to save damsels in distress, you'll love the blazing excitement of JUMPMAN. Your incredible speed and jet boosters let you leap from girder to girder, scale ladders and ropes to disarm the bombs planted in Jupiter Headquarters. But it's not easy and there are thirty levels of difficulty. You'll have to dodge missiles, killer robots, flying saucers, crumbling girders and vanishing escape Routes. In the heat of battle, JUMPMAN must keep a cool head.

EPYX

The Award-Winning Computer Games

Epyx, 1043 Kiel Court, Sunnyvale, California 94086

CIRCLE 162 ON READER SERVICE CARD

JUMPMAN Designed by Randy Glover
DONKEY KONG is a trademark of Nintendo of America, Inc.

creative computing

SOFTWARE PROFILE

Name: Reach for the Stars

Type: Strategy game

Authors: Ian Trout and Roger Keating

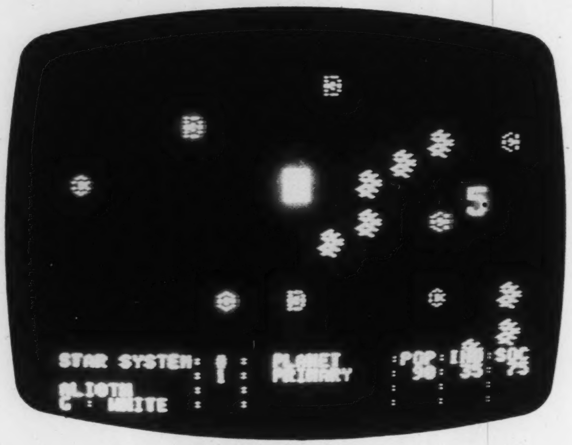
System: 48K Apple II

Format: Disk

Summary: Exciting and enjoyable simulation

Price: U.S. $52.00

Manufacturer:
Strategic Studies Group
Ground Floor
336 Pitt St.
Sydney, 2000 Australia



Reach for the Stars

mined by the technological level.

Gameplay proceeds in turns. Production phase takes place on odd turns, during which resource points are spent. Most of the action, though, takes place in the phases that follow. In these phases, ships are moved to new star systems, convoys of starships and transports are formed, explorers are assigned to missions, and colonies are landed. Next, all combat is resolved between opposing ships. Finally, forces may attack opposing planets.

Like most games of its kind, *Reach for the Stars* was slightly confusing at first, and it took me nearly two hours before I fully understood the game. The player's manual is adequate, but it lacks clarity in a few places, such as its explanation of establishing colonies.

Playing by myself against three computer opponents, I found *Reach for the Stars* absorbing and quite enjoyable. Because it required frequent decision making, it maintained my attention and interest. My mind had little time to wander as it often does in other slow-moving strategy games. The game increases in intensity as more colonies are established and more decisions must be made, especially during movement phase. Note, however, that options are available to aid in playing, such as that for the automatic movement of explorer ships.

The game seemed somewhat sluggish when I played against a friend and two computer opponents. With the two of us at the keyboard of the Apple, each had to look away while the other keyed information that he wished to remain secret. The decision making process that satisfied me before now left me waiting anxiously for my turn. *Reach for the Stars*, I believe, is best when played solitaire.

As a strategy game player, I can appreciate the use of high-resolution graphics in this simulation. Several other strategy programs take the shortcut of using the text screen for the map of territory involved, reasoning that graphics are not necessary for a game of this nature.

Another feature that I liked was that the basic game can be enhanced by using any or all of the "game options." These eight additional twists to the game include the possibility of natural disasters, the solar debris effect, the formation of novas, and the intervention of irritant life forms known as xenophobes.

Followers of strategy board games such as Avalon Hill's *Third Reich* and Metagaming's *Stellar Conquest* will recognize familiar traits in this simulation. The ideas of resource points, production, development, and conquest have succeeded before. They offer the basis for exciting and satisfying games. *Reach for the Stars* is a stimulating program written in the fine tradition of these simulations. —*SW*

"I think I've finally debugged that crazy program of yours..."

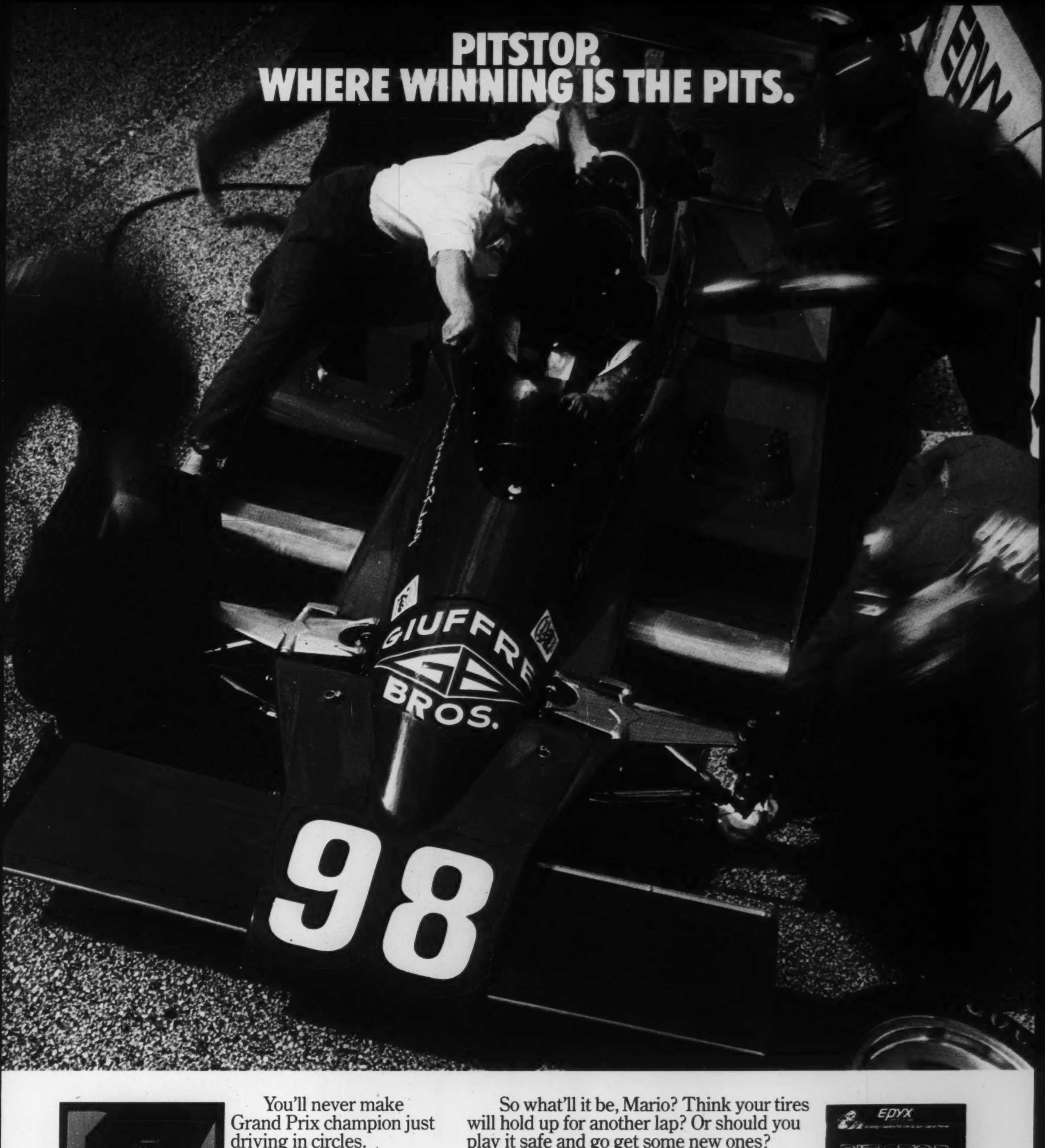
Buzzard Bait

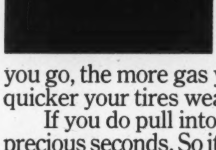
On the planet Earth, humans sometimes scatter bird seed on their lawns to attract their feathered friends. Imagine, instead, a world where carnivorous birds gather their own living food—a morbid scene in which humans are snatched from the ground by huge buzzards and fed whole to their babies. No, this ghoulish world does not exist in the Twilight Zone, but rather, in *Buzzard Bait*, a new game from Sirius Software.

Designed on the Apple by Mike Ryeburn, *Buzzard Bait* is also available for the IBM-PC. This 48K game can be played with either a set of paddles, the keyboard, a joystick, or an Atari joystick in conjunction with the Sirius Joyport. My preference is a potentiometer joystick.

You begin each game with three ships at your disposal. To defend against the egg-dropping birds, your ship fires bursts of two shots in rapid succession. This is comforting, because after the three pairs

PITSTOP.
WHERE WINNING IS THE PITS.





You'll never make Grand Prix champion just driving in circles.

You've got to stop sometime. The question is when. Right now you're in the lead. But the faster you go, the more gas you consume. And the quicker your tires wear down.

If you do pull into the pits, though, you lose precious seconds. So it's up to you to make sure the pit crew is quick with those tires. And careful with that gas. Otherwise, poof! you're out of the race.

See your retailer for available computer formats.

CIRCLE 161 ON READER SERVICE CARD

So what'll it be, Mario? Think your tires will hold up for another lap? Or should you play it safe and go get some new ones?

Think it over. Because Pitstop™ is the one and only road race game where winning is more than just driving. It's the pits.

Goggles not included.

One or two players; 6 racecourses, joystick control.

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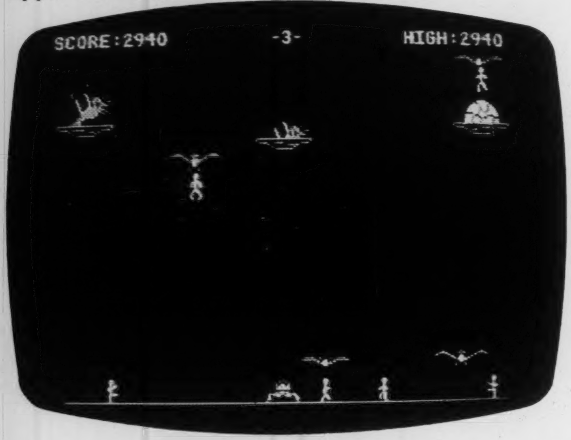
STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

EPYX
PIT STOP



Buzzard Bait

creative computing
SOFTWARE PROFILE
Name: Buzzard Bait
Author: Mike Ryeburn
Type: Arcade game
System: 48K Apple II/II+/IIe, IBM-PC
Format: Disk
Language: Assembly
Summary: High flying action.
Price: $34.95
Manufacturer:
Sirius Software, Inc.
10364 Rockingham Dr.
Sacramento, CA 95827

of birds are finished making whoopie in the nests above, they waste no time in attacking the helpless humans on the ground. After a buzzard wraps its talons around a human, it soars back to its nest to place the tasty morsel in the open mouth of its young. In this manner, the baby bird grows strong enough to leave its nest and join the hunt.

Not only must you dodge the rotten eggs that are hurled at your ship, but you must avoid any contact with the buzzards themselves. Some of these guys are actually bigger than your whole fighter! Quick, somebody notify the Audubon Society.

Aiding the flock of buzzards are green and white penguins which have a nasty habit of flying too close to the ground. Penguins can be shot, but since they carry no point value, they are strictly a nuisance. Instead of shooting a penguin, you may opt to leap over it when it threatens you. Pressing the second control button propels your ship high into the air. Sometimes this feature allows you to escape certain death, while at other times it sends you crashing into an attacking buzzard.

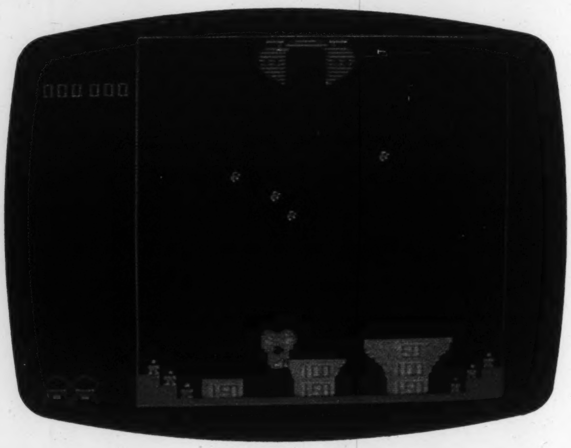
Every now and then, after you destroy an attack wave, you are given a chance to earn an extra ship. A space scene fills the screen and your ship is cast among a group of harmless penguins. The object here is to gather the three missing pieces of your ship without running into any of the explosive mines left behind by a thoughtless space traveler. This task is complicated by the penguins which cause you to bounce wildly if you bang into them accidentally.

Buzzard Bait features beautifully executed animation complemented by well done sound effects. Even when the entire screen is alive with flying buzzards and running humans, none of the elements appears to flicker. While the graphics are not earth shattering, they are certainly top notch.

By no means your ordinary shoot-'em-up game, *Buzzard Bait* requires both a quick trigger finger and the ability to make split-second decisions. This program is a must for anyone who has ever had nightmares after watching a late night showing of *The Birds*. —*OWL*

Mission: Escape

Mission: Escape is an Apple version of Lunar Rescue, an old arcade game in which you pilot a shuttlecraft to the planet surface below and pick up stranded astronauts. *Mission: Escape* runs on any 64K Apple-compatible machine and is brought to you from MicroSparc, a New England-based software company.



Mission: Escape

creative computing
SOFTWARE PROFILE
Name: Mission: Escape
Author: Thomas Schumann
Type: Arcade game
System: 64K Apple
Format: Disk
Language: Assembly
Summary: Nice, but nothing new.
Price: $29.95
Manufacturer:
MicroSparc Inc.
10 Lewis St.
Lincoln, MA 01773
(617) 259-9710

The object of *Mission: Escape* is two-fold. First, you must descend through a belt of slowly moving meteors and safely reach a designated landing pad in the lunar crater at the bottom of the screen. Once done, an astronaut hops aboard, and your job is to bring him back to the mothership that hovers above. Careful though, simply touching an asteroid spells the doom of your mission. On your ascent, you can fire missiles at the scrolling meteors to clear a path for your craft.

After all of the astronauts are either dead or safe in the hull of the mothership, points are awarded for completing the mission. If you finish a round with no fatilities, you earn a special bonus. Each subsequent round brings with it new and increasingly difficult hazards.

The documentation provided with *Mission: Escape* states that the game can be played either on the keyboard or with a paddle. I find, however, that a switch-type joystick works best.

As I play *Mission: Escape*, I am reminded of *Meteor Mission*, a fine TRS-80 game from Big Five Software that I reviewed well over two years ago—both are based on the same video game. It is a shame to see a skillful programmer like Tom Schumann put so much effort into mimicking an antiquated game. I hope that he chooses a more exciting medium for his next offering. The talent is definitely there; only originality is lacking. —*OWL* ☐

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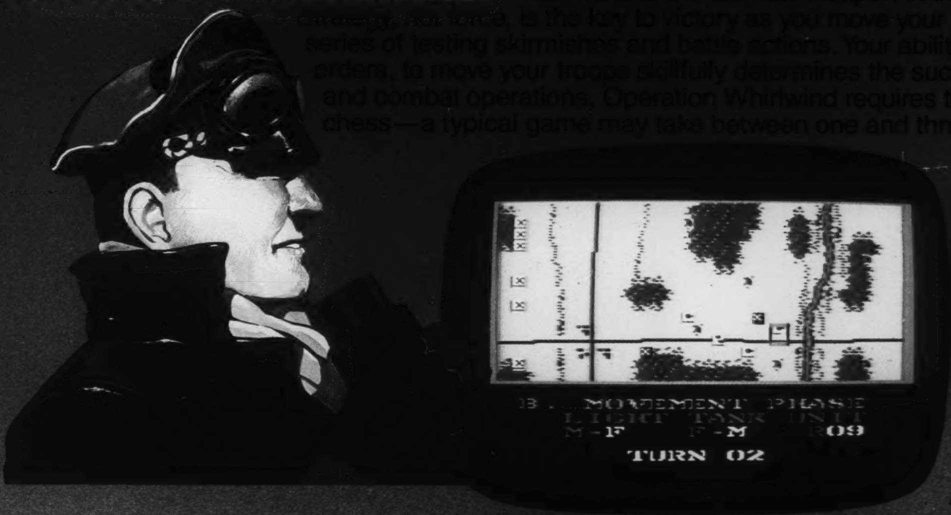

MATCHBOXES™

Pit your concentration against another player or the computer. Here's a puzzle game that will keep the whole family bemused, befuddled and playing happily for hours. A grid of 36 numbered boxes conceals an animated menagerie of colorful characters, creatures and objects. The object of the game is to match identical squares and then solve a hidden word puzzle. There are many game variations with puzzles that are frontward, backward, or scrambled. Matchboxes. It's the most memorable memory game you've ever played! Available on disk and cassette.

OPERATION WHIRLWIND AND MATCHBOXES FOR THE ATARI® HOME COMPUTERS. ATARI® is a trademark of Atari, Inc.

Make sure to look for The Arcade Machine™ and Brøderbund's new game phenomenon, Lode Runner™—also for Atari.

Brøderbund Software

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17 Paul Drive San Rafael, CA 94903

CIRCLE 123 ON READER SERVICE CARD

Inside Apple

Vol. 1, No. 3

Apple's new Monitor II. A sight for sore eyes.

If you've been using a TV as a monitor, perhaps you can get a friend to read this for you:

Apple's brand new Monitor II will improve your vision.

It features all the latest ergonomic improvements in monitor technology.

For example:

Studies have shown that the leading cause of eye fatigue for computer users is lack of contrast between the displayed characters and their background.

So we designed the Monitor II around a high contrast green phosphor CRT that provides an extremely dark background. That means you can read text at a lower brightness. And that means you can be more productive — working longer and more comfortably.

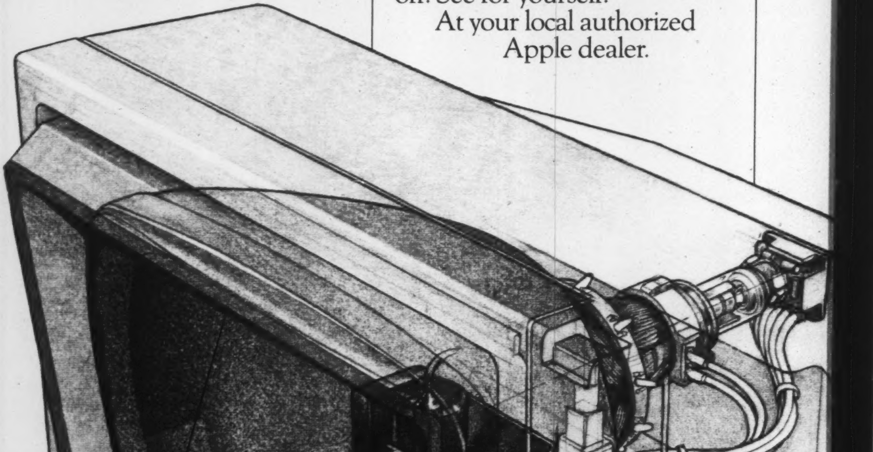
Toward that same end, we also gave Monitor II a tilt screen. So you can angle it perfectly for your working position, without scooting your chair around or sitting on phone books.

And we made that screen antireflective to reduce glare from ambient light.

Monitor II also features a high bandwidth video amplifier and a high tolerance linearity circuit. The former keeps characters from smearing on the screen and eliminates the annoying "ghosts" left by a fast moving cursor. The latter keeps characters crisp, legible and prevents "keystoning" right up to the edges of the display. Both add up to superior display of 80-column text and extremely accurate graphics.

Designed as the perfect system partner for the Apple® IIe Personal Computer, Monitor II requires no monitor stand. It's a perfect fit, aesthetically as well as technically. So it's pleasing to the eye even when it's turned off. See for yourself.

At your local authorized Apple dealer.



Screen tilts for best working position.

Antireflective screen.

Interior of CRT is etched to reduce glare and improve crispness.

Fits perfectly atop the Apple IIe.

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Since color graphics are becoming ever more important in business, we've been hearing more and more calls for a color plotter as reliable as an Apple.

Here it is:

Apple's new Color Plotter can generate all kinds of presentation graphics, engineering drawings or anything else you have to illustrate in up to eight brilliant colors.

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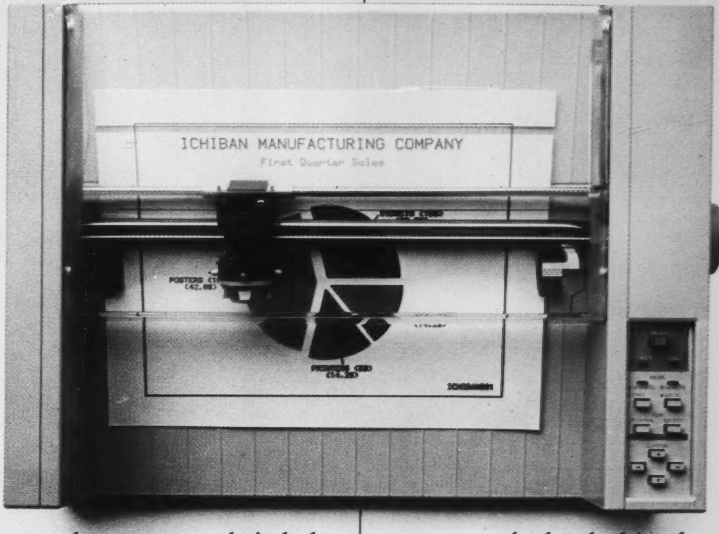
Measuring just 4.8"H x 16"W x 12"D, it's the smallest four-color, wide bed color plotter you can buy — about half the size of conventional flatbed plotters. So it takes up less space on your desk and can easily be moved to someone else's desk.



There are two color plotter accessory kits to choose from to assure a perfect marriage with your Apple II or IIe, or Apple III.

Each kit comes with eight color pens — red, blue, green, black, burnt orange, gold, violet and brown. Plus a starter package of plotter paper. Plus all the manuals, documentation and cables appropriate to your particular kind of Apple. So you can get up and coloring right away.

Apple also offers a complete selection of 24 different pen packages — so you can choose whatever colors you need in a variety of widths for a variety of applications and media types.

As you might expect, all of the above is available at many of our authorized Apple dealers.

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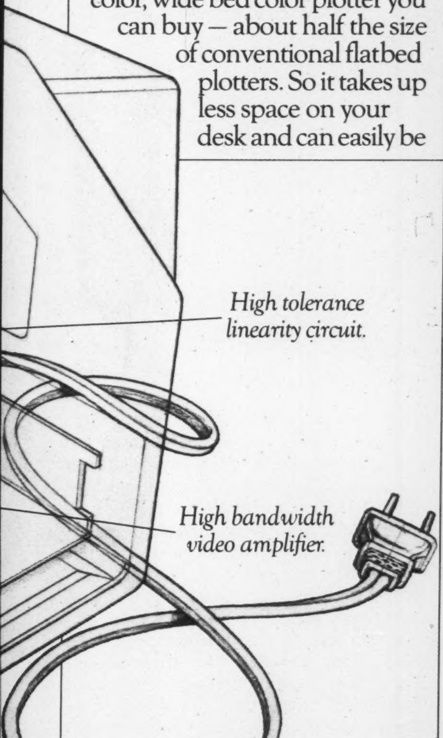
High tolerance linearity circuit.
High bandwidth video amplifier.

Apple Computer Inc., 20525 Mariani Ave., Cupertino, Calif. 95014. For the authorized dealer nearest you, call **(800) 538-9696.** *© 1983 Apple Computer Inc.*

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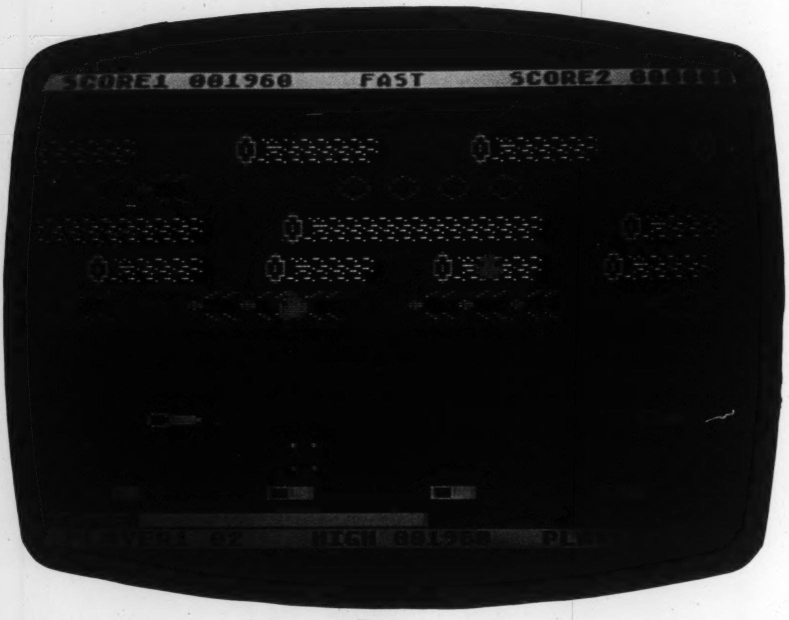
CIRCLE 114 ON READER SERVICE CARD

creative computing software evaluation

Arcade Action For The Commodore 64

Andrew Hurdidge

Sierra On-Line has entered the slowly maturing Commodore 64 software market with three converted Apple games, two of which are *Crossfire* and the licensed version of Sega's coin-op *Frogger.* They have done an admirable job.



Frogger

Frogger

Many games boast action so quick and graphics so clear that they make you think you are in an arcade. Sierra On-Line's licensed version of *Frogger* for the Commodore 64 is one of them. But unlike many others, *Frogger* holds true to its claim. It is the best version of *Frogger* I have seen for any machine.

The object of *Frogger* is to guide your frog safely across a busy highway, over a river, and home to his lilypad in the allotted time (120 beats of the timer). To accomplish this successfully, he must cross the highway without being run over and cross the river without falling in. The latter seems rather strange considering that frogs are very adept at swimming.

creative computing
SOFTWARE PROFILE

Name: Frogger
Type: Arcade game
System: Commodore 64
Format: Disk/Cassette
Author: Chuck Benton
Summary: Excellent version of arcade Frogger.
Price: $34.95
Manufacturer:
Sierra On-Line, Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614

Your frog must avoid cars, trucks and bulldozers, deadly snakes, otters, crocodiles, and the treacherous diving turtles. After five frogs have made it to their lilypads, you advance to the next level.

You move your frog vertically and horizontally using a joystick or, as with *Crossfire*, the redefinable keyboard. *Frogger,* however, lends itself much more to keyboard use than *Crossfire.* The responsiveness of both the joystick and the keyboard is outstanding. Your frog moves as fast as you can press the joystick or hit a key.

The screen is split into two main parts, the highway and the river. The highway, the first obstacle to be overcome, is located at the bottom of the screen. Situated in between the highway and the river is a narrow strip which in the lower levels offers refuge from danger. In the higher levels this area is patrolled by a dangerous slithering snake. At the top of the screen is the river and your final destination—the lilypads.

Much care has been taken in creating the *Frogger* graphics. The sprite animation of the frog is extremely realistic. It looks much better than the arcade frog. Details such as the tread on the bulldozers, which are made to look as if they are actually turning, are outstanding. The excellent three dimensional logs and the "Game Over" sign which glides

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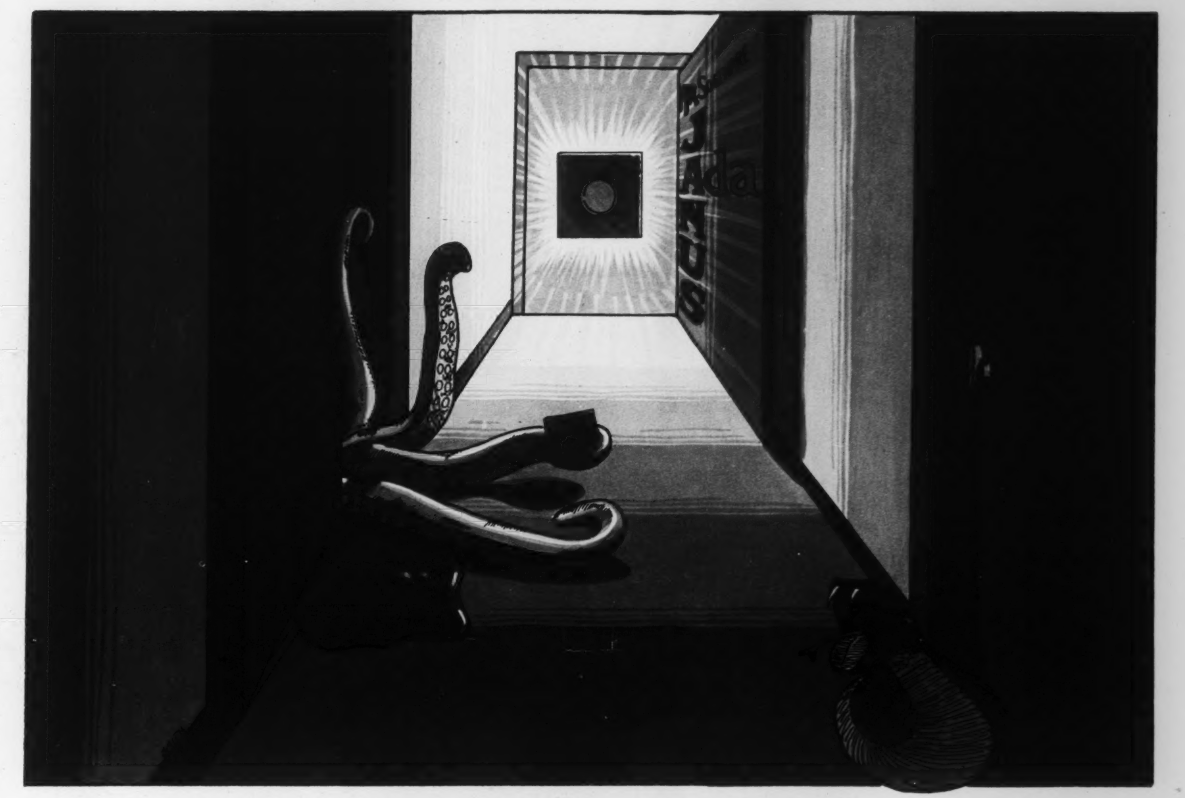
Andrew Hurdidge, 91 May Dr., Chatham, NJ 07928.

THE EASY CHOICE



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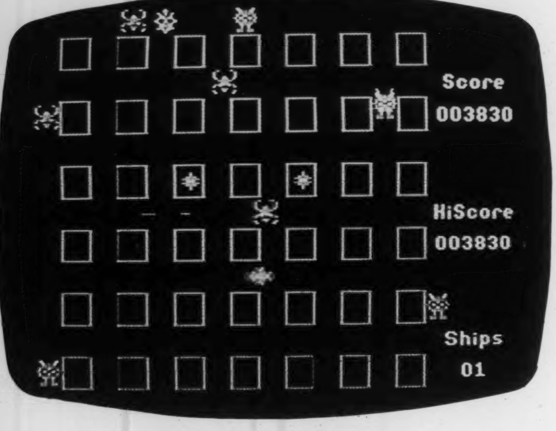
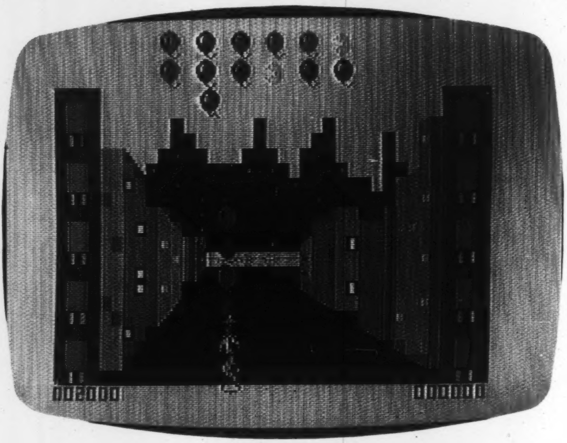


Crossfire



Kickman

across the screen atop a log make On-Line *Frogger* a great replica of the arcade version.

As in the arcade version the music is non-aggressive and has a winsome melody. Also, bonus points are awarded for gobbling insects, escorting ladies home to your lilypad, and completing a level.

When I first read about the Commodore 64, I revelled in the thought of the games that could be made with its sophisticated high–resolution graphics. *Frogger* comes very close to the games I envisaged. Perhaps Commodore, too, had games such as *Frogger* in mind when they dubbed the 64 "The most brilliant game machine you can buy."

Crossfire

In *Crossfire* aliens have landed and are steadily taking over the evacuated city destroying everything in their paths. You have three ships with which to defend the city from the onslaught.

Crossfire is a one-player shoot-'em-up that brings new meaning to the cliche hand-eye coordination. You navigate your ship around the city using a joystick or the keyboard, which to my delight can be redefined to your liking. But even with the ability to select your own keys, *Crossfire* is not a game to be played with the keyboard. I strongly recommend having a joystick before you even attempt to play this game, as using the keyboard requires the manipulation of nine separate keys.

The screen graphics consist of a top view of the city streets which closely resembles the coin-op game Targ. When the game starts, the aliens are surrounding the city and beginning their intelligent attack. Your ship is located in the center of the city where it is vulnerable to the aliens' fire from all four compass directions. You can replenish your ship's ever dwindling supply of ammunition by entering a refueling station, which is randomly placed about the city. After successfully ridding the city of aliens (clearing a board) you advance to the next level. Each new level brings with it faster and more aggressive aliens and less ammunition for your ship, until you reach the minimum of fifteen missiles.

The first thing that struck me upon loading the program was the music. I started off quietly humming the tune, and before I knew it I was singing it out loud. It is fast paced and catchy, and adds greatly to the excitement of the game. Then I toggled off the music and noticed, to my surprise, the virtual absence of the sound effects. All I heard for the effort of blowing up an alien was a disappointing "pop." This disturbed me, as *Crossfire* is the type of game that will appeal to shoot-'em-uppers who thrive on noise as a vampire thrives on blood.

The next thing I noticed was the lack of color in the game. Everything seemed to be in red and blue. I tried adjusting the controls on the monitor, but to no avail. As a check, I switched to a regular television and got the same result. The game does not make nearly enough use of the 16 colors available on the 64.

creative computing

SOFTWARE PROFILE

Name: Crossfire
Type: Arcade game
System: Commodore 64
Format: Disk/Cartridge
Author: Chuck Benton
Summary: Fast-paced action.
Price: $34.95

Manufacturer:
Sierra On-Line, Inc.
36575 Mudge Ranch Rd.
Coarsegold, CA 93614

The handsome *Crossfire* box depicts a man's hands (which I assume are the player's) firing a laser pistol at an android. Seeing the box, you could mistakenly be led to believe that *Crossfire* is meant to be a version of Berzerk for the 64. Not so. *Crossfire* is rather a cross between Targ and Space Zap.

Crossfire is a game that can be criticized for its lack of color and sound effects. Apart from these two points, which are quickly and easily forgotten as the game progresses, it is an action packed game that is addictive and fun to play. When compared to currently available games for the Commodore 64, *Crossfire* is outstanding.

Kickman

Trying to remain the "Friendly Computer" company in the minds of its devoted customers, Commodore has released, as promised, its first batch of entertainment software for the Commodore 64. Among these is Commodore's version of *Kickman,* a relatively unknown coin-op game by Bally/Midway.

The game screen consists of a three-dimensional city street. A skillful unicyclist at the bottom of the screen is dressed as a clown, and you control his left/right movements with a joystick or the keyboard. Swaying, multicolored balloons, shifty-eyed ghosts, and chomping Pac-Men fall from above the clown, and it is your task to burst or catch them on the top of his pointed hat.

The speed at which an object falls is indicated by its color, making for a colorful game. The clown unicyclist can

creative computing
SOFTWARE PROFILE

Name: Kickman
Type: Arcade game
System: Commodore 64
Format: Cartridge
Summary: Good adaptation of the arcade version.
Price: $29.95
Manufacturer:
Commodore Business Machines
1200 Wilson Dr.
Westchester, PA 19380
(215) 431-9100

kick any objects that fall below the level of his waist back up into the air. As the game progresses and the objects fall faster, you are virtually juggling! When a Pac-Man falls on top of a stack of balloons or ghosts, he chomps through them and comes to rest on the clown's head.

Missing one of the objects causes the clown to fall off his unicycle, scattering in all directions any previously caught balloons and ghosts, and resulting in the loss of a "life."

Kickman *is a good adaptation of the coin-op game.*

If you are familiar with the arcade version, you will notice the omission of the bonus round with the mad bomber. Also, running into a falling object will not cause it to be knocked aside. In addition, Commodore's version is for one player only. These are only minor drawbacks and in no way impede the game play.

A word of warning if you are using the keyboard. It is easy to mistakenly hit the SHIFT LOCK key instead of the A key (the kick key) frustratingly preventing the A key from being read. I found the background music to be repetitive and annoying and a poor imitation of the carnival music of the arcade version.

On a positive note, the animation is smooth and realistic and the 3-D background is great. As a handy feature, the RUN/STOP key doubles as a pause, allowing you to take a breather.

In summary, *Kickman* is a good adaptation of the coin-op game. It is a welcome change from the usual shoot-'em-up games and will be enjoyed by those familiar, as well as those unfamiliar with the arcade version. ☐

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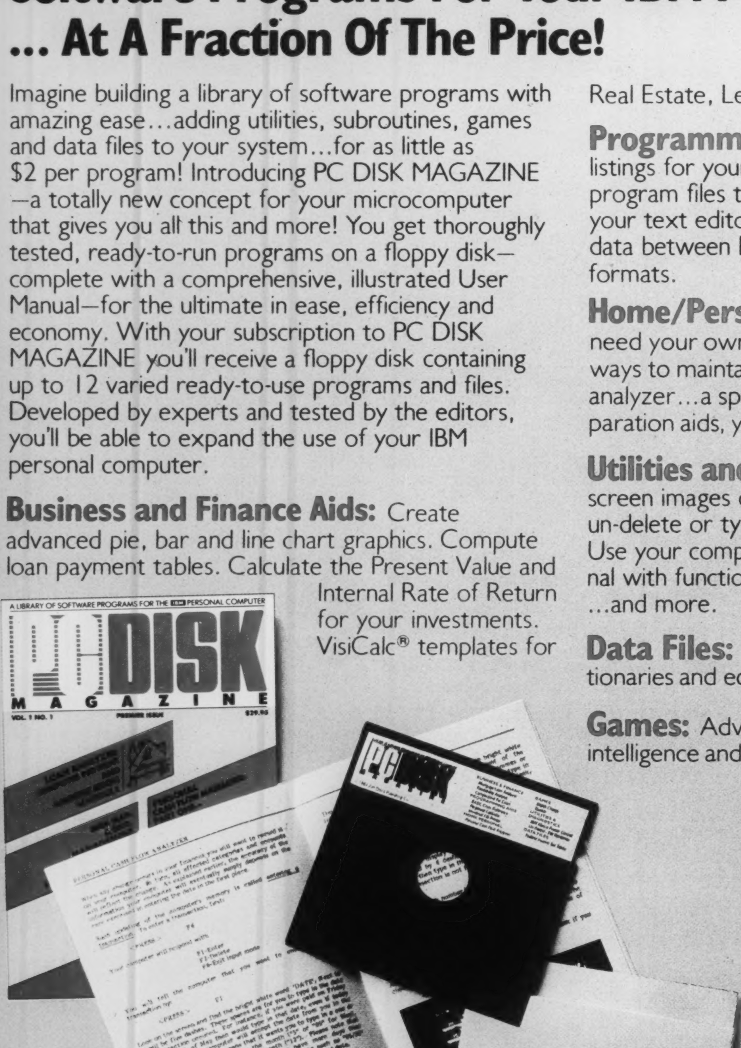
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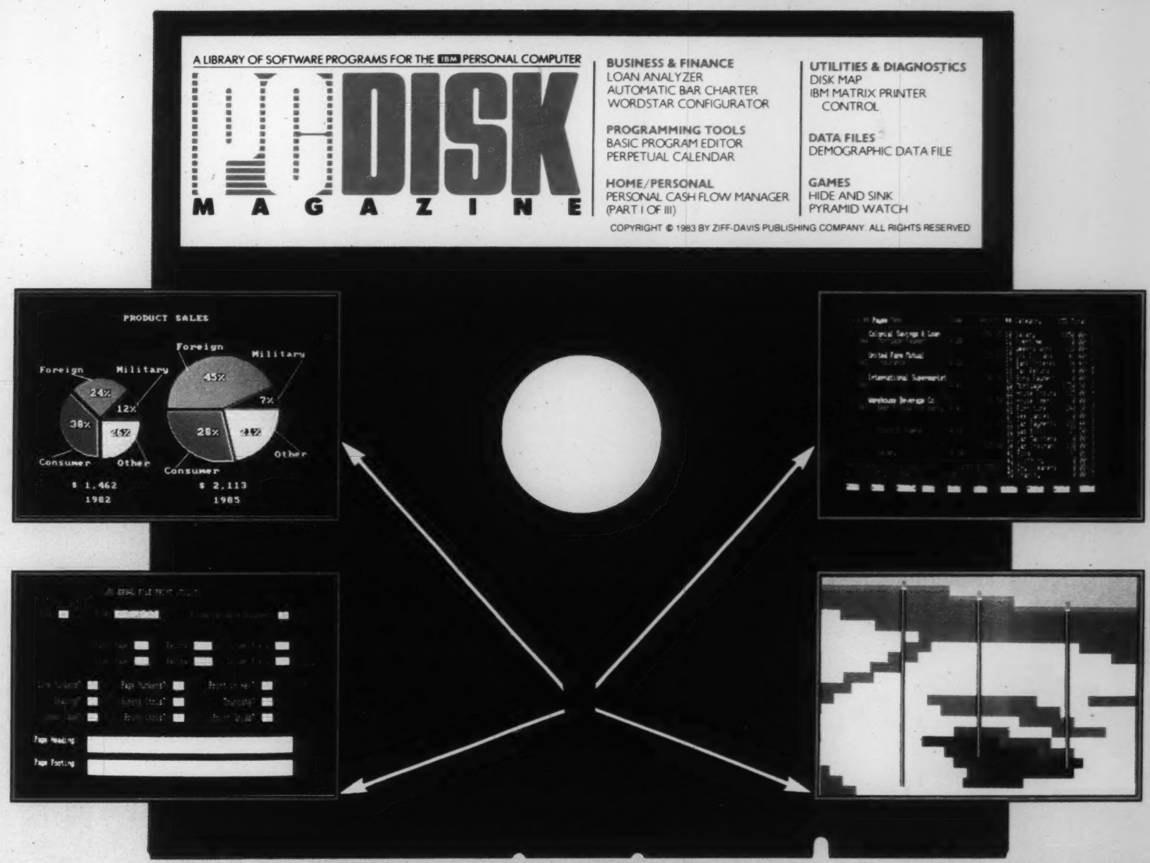

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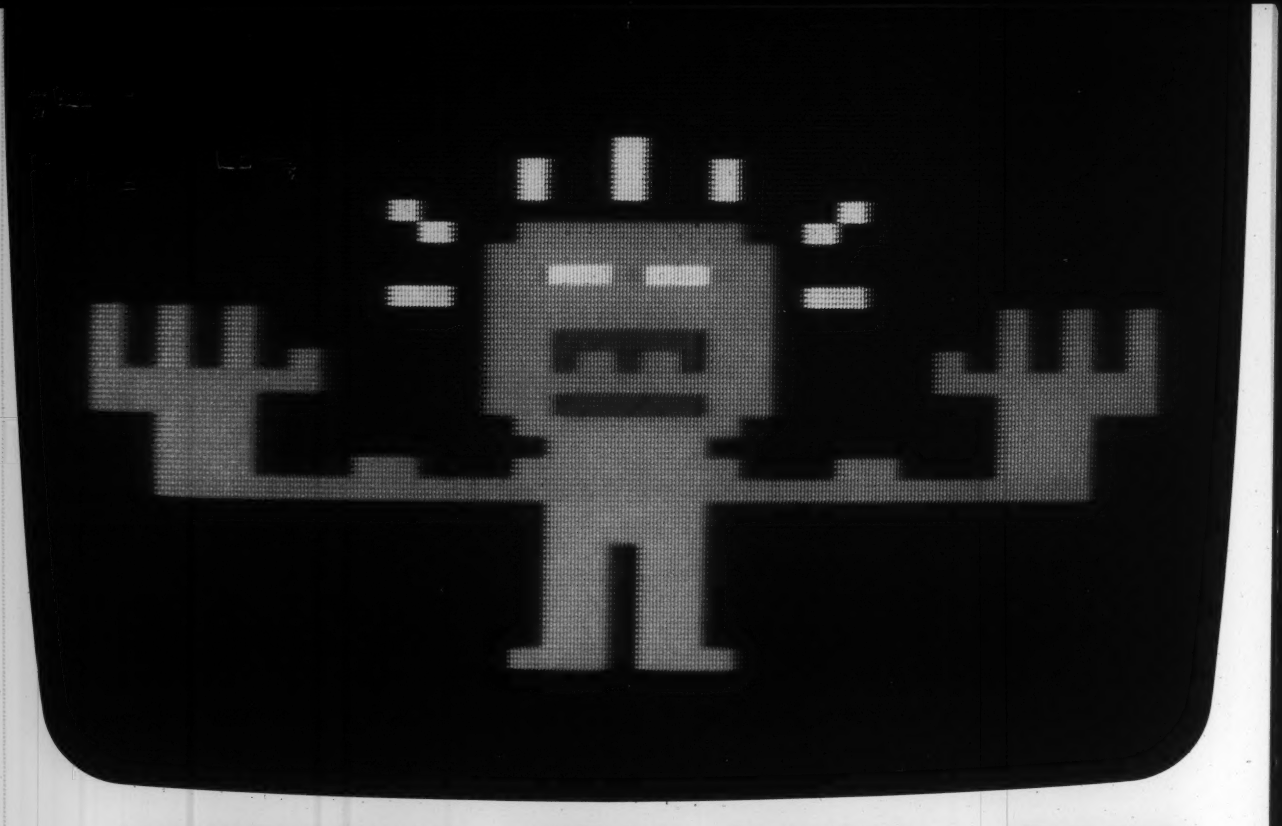

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Zork III

Carl Townsend

Zork III, the sequel to *Zork I* and *Zork II*, starts at the bottom of an endless staircase: "As in a dream, you see yourself tumbling down a great, dark stairway. All about you are shadowy images of struggles against fierce opponents and diabolical traps. These give way to another round of images—imposing stone figures, a cool, clear lake, and an old, but oddly youthful man."

"He turns toward you slowly, his long, silver hair dancing about him in a fresh breeze." "You have reached the final test, my friend. You have proved clever and powerful, yet this is not enough. Seek me when you feel yourself worthy!" His words echo as the dream dissolves around you . . .

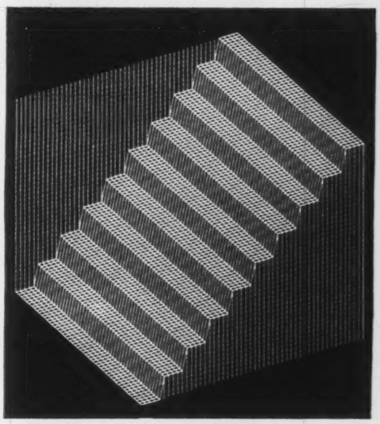
"You are at the bottom of a seemingly endless stair, winding its way upward beyond sight. An eerie light coming from all around you casts strange shadows on the walls. To the south is a dark, winding trail. Your old friend, the brass lantern, is at your feet."

As with most adventures, there are few instructions supplied. You must discover your own directions to the game as well as the object of the game. *Zork III* responds to simple verb and noun instructions (e.g., GO WEST) and in some cases requires an adjective or adverb. For example, if you are in a room with several doors and you enter OPEN DOOR, Zork asks you which door you wish to open.

As you begin your adventure, you find a sword protruding from a rock, but you can't wrestle it free. If you survive a fight with a strange hooded figure, you hear an ominous rumbling that shakes the entire cavern. The action moves swiftly, keeping the explorer on the edge of danger.

Time Is Related To The Events

Zork III, at times, appears to run in a real-time mode. Unlike Infocom's *Deadline*, however, *Zork* is not a real-time game. There is no clock ticking, and there is no demand on the user to complete the game in a set period. You find, however, that time has a strange relationship to the events. To tell you more than this would spoil the adventure.



Soon you are aware that someone is watching you and is very interested in your progress. Almost in a real-time mode, the character appears at the top of a cliff while you try to open a chest on the ledge below. As you become frustrated, he offers to help. You have to decide whether you want his help and how much to trust this strange fellow.

creative computing

SOFTWARE PROFILE

Name: Zork III

Type: Prose adventure game

System: CP/M with 48K,
Apple, Atari, IBM,
NEC PC 8000, DEC Rainbow,
Commodore 64, Osborne,
TI, Digital RT 11

Format: Disk

Summary: One of the best adventure challenges

Price: $39.95 ($49.95 on some systems)

Manufacturer:
Infocom, Inc.
55 Wheeler St.
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Several well designed puzzles in the cave kept me busy for hours. If you think you are ready for the Royal Puzzle, you can drop down into a room of sandstone and marble walls. Moving walls, ladders, a strange door with a slot, and an odd black book all add to the puzzle. More intriguing is the mirror box with two poles, two panels, and four walls—all of which move.

I had a great deal of fun with the three machines in the Technology Museum, although I could get only one of the machines to work. It has enough power, however, to get you into plenty of trouble. The trick is to discover how the machine works (it has one button and a dial), what it does, and how to make it work to your advantage.

Solving The Final Puzzle

The end-game was particularly exciting. As the pieces of the game fall together, you suddenly become aware of the purpose of the game. You can then meet the challenge of the end-game and solve the final puzzle.

It is not necessary to have played *Zork I* or *Zork II* to enjoy *Zork III*, but there are relationships among the three games. *Zork III* is the last of the series. Playing *Zork III*, you find yourself in areas discovered in *Zork I* or *Zork II*. I have played all three, and, in my opinion, *Zork III* is the best of the series.

If you find yourself hopelessly lost and unable to solve a puzzle or reach the end of the game, there is plenty of help available from the Zork User's Group. You get information on this group when you purchase *Zork III*. The user group provides dungeon maps at reasonable cost and an Invisiclues book in which you can use a special marker to reveal invisible clues.

Infocom traditionally supplies some of the most entertaining CP/M games. If you like good game challenges, try *Zork III*. ☐

Carl Townsend, 4110 N.E. Alameda, Portland, OR 97212.

Dungeons, Vermin, 'Copters and Claim Jumpers

Brian J. Murphy and Steve Williams

Tronix and Epyx have more in common than the letter x; both publish sophisticated games for the Commodore Vic 20.

Here we look at three original arcade games and a complex adventure in the tradition of Automated Simulations. At least one is sure to find its way to the top of your Christmas list.

Scorpion

What is your favorite frog sport? Some players like to jump froggers across lanes of fast moving traffic, others prefer to stun them with a jolt of venom and store them up in a scorpion's hole for a rainy day snack.

If you belong to the latter group, you are, above all, very weird. You are also very likely to enjoy *Scorpion*, a hi-res color arcade game cartridge for Vic 20 systems by Jimmy Huey, for Tronix.

The lovable "hero" of this game is a nasty, venomous scorpion, on the prowl for frog eggs or, if none are available, whole frogs to bring back to the nest for midnight snacking. As the game begins the scorpion is found sitting quietly at home, awaiting the firing of a joystick button to be let loose on his unsuspecting environment.

The scorpion moves in a very competitive environment that looks like a laboratory maze infested with all sorts of nauseating vermin. Hampering the progress of the scorpion in his search for frog-flavored snack food are predators ranging from dragons and worms to Venus flytraps, nasty "pod babies" and lethal "pod mothers." Your scorpion moves with greater speed than any of his enemies, and one blast from his stinger is usually enough to kill any of these creatures.

Of course the frog eggs your scorpion is after are frequently surrounded by one or more of these predators, and just as frequently stray stings destroy valuable eggs. That is too bad, because the eggs are worth 3200 points (in the "easy" version of the game you get bonus scorpions for scoring 4000 points) if you bring all four

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Brian J. Murphy, 133 Post Rd., Fairfield, CT 06430.

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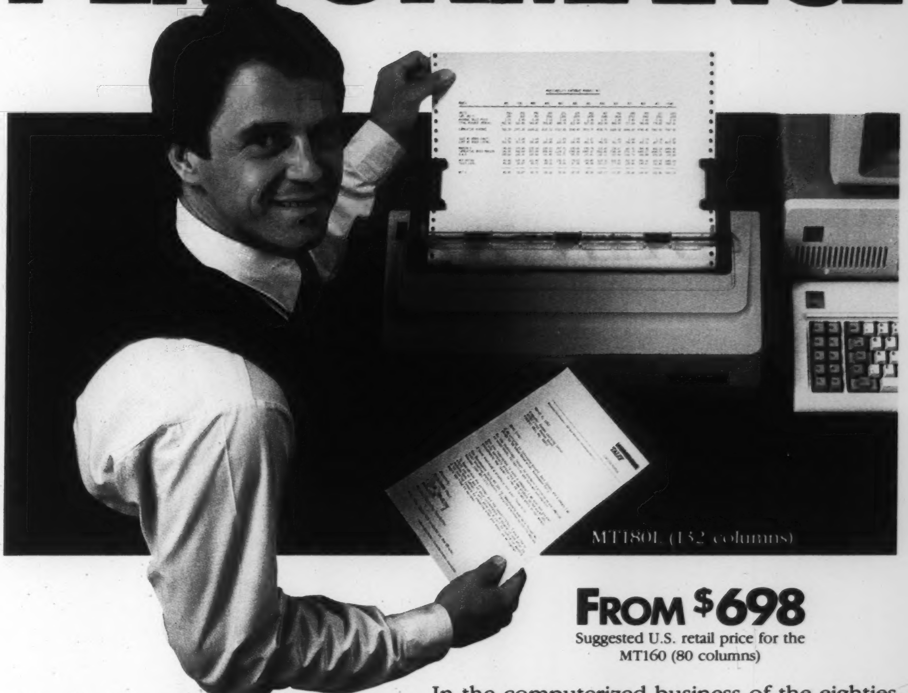

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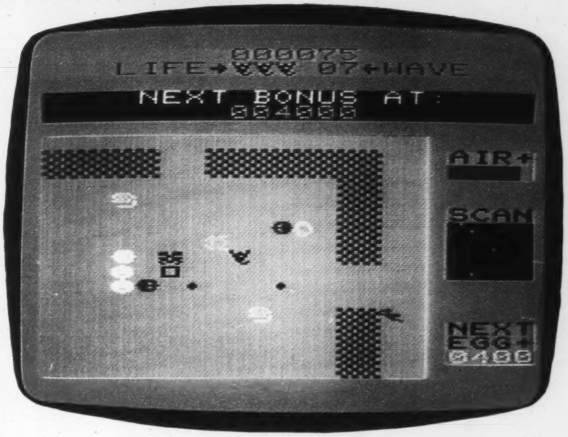
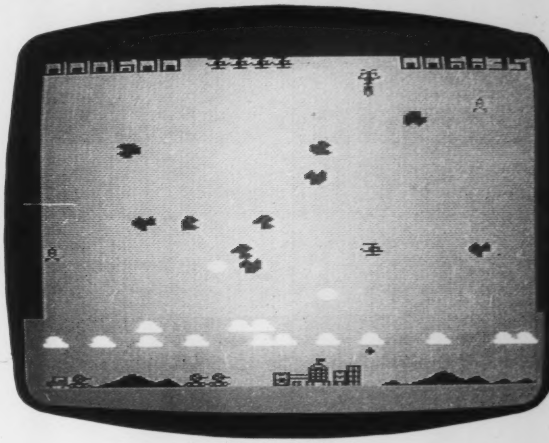


Scorpion



Deadly Skies

creative computing

SOFTWARE PROFILE

Name: Scorpion
Author: Jimmy Huey
Type: Single player arcade
System: Vic 20
Format: Cartridge
Language: Machine language
Summary: Offbeat game with action to spare on 32 levels!
Price: $39.95
Manufacturer:
Tronix Publishing
8295 South La Cienga Blvd.
Inglewood, CA 90301

of them back—before they hatch into predatory frogs.

Nothing is harder on the appetite than bringing home an egg for breakfast only to have it hatch on you and bite your head off. It is just as bad to be heading for the egg department, after some unavoidable delays caused by having to kill a dozen dragons and worms that were attempting to devour you, only to find your intended omelette, now a crazed killer frog, charging at you with the intention of smashing you into a pulp. In a situation like this the best advice is to run far enough away to give you time to bring your stinger to bear on the frog for a stunning jolt of venom. Safely stunned, he can then be brought back, alive but paralyzed, to the scorpion's lair.

As the required number of frogs and frog eggs are collected, the game increases in difficulty and the layout of the maze changes. The number of predators also increases, and many of them swarm around the scorpion's hole and must be killed before he can even come out to start the next turn. If you can keep the scorpion on the move and keep shooting a constant stream of venom bolts, you should be able to survive to complete all the levels—all 32 of them. If that is not enough of a challenge, you could try one of the higher difficulty levels you can choose when the game boots.

The theme of *Scorpion* is, to put it mildly, rather offbeat, but that adds to the novelty of this well designed, fast moving game. If you crave an exciting game with plenty of violent, noisy action, *Scorpion* will surely fill the bill. *—BJM*

Deadly Skies

The skies aren't all that friendly, no matter what United Airlines says. There are asteroids, smart bombs, anti-aircraft missiles and even UFOs that all do their level best to blow you and your helicopter out of the skies, and only because you are on an innocent little weekend bombing mission.

In *Deadly Skies*, a Vic 20 game by Thomas Kim for Tronix, you face all these hazards as you pilot your helicopter above a constantly shifting landscape of military installations and anti-aircraft missile sites. Using joystick controls you can move your 'copter in any direction you please to track the targets below or to avoid the ever-intensifying volleys of anti-aircraft fire from below and above.

As the game begins, the target area is completely obscured by a double row of clouds. You won't be able to hit your targets until you first blow some gaps in the clouds. While you are trying to do this, a UFO will be cruising by overhead, dropping bombs on you, so keep moving and shifting. Also, keep your eyes peeled for the round little "smart bombs" which will be fired up at you from the ground. They will follow you doggedly and shoot you down if you are too slow in evading.

As your skills improve and you wipe out the targets on the ground, the game automatically moves you up to the next level of difficulty. As the game progresses you find that more and more anti-aircraft fire is being directed at you.

creative computing

SOFTWARE PROFILE

Name: Deadly Skies
Author: Thomas Kim
Type: Arcade
System: Vic 20
Format: Cartridge
Language: Machine language
Summary: Challenging fun with helicopters vs. missiles, bombs, and asteroids!
Price: $39.95
Manufacturer:
Tronix Publishing
8295 South La Cienga Blvd.
Inglewood, CA 90301

On some of the levels, you encounter mostly smart bombs. More than a dozen can be in the air at one time, forcing you to spend most of your time running away from them, rather than aiming your bombs. At other times dozens of rockets are fired at you, several volleys at a time. With the skies full of missiles, you will find it hard to thread a safe path, even though they aren't homing in on you.

Another reward of reaching the higher levels are the banks of asteroids which course through the air, drifting like deadly clouds. Evading the missiles and smart bombs is doubly hard when you also have the slow-moving asteroids in your way. Worse, even though you collect a point per hit on them, they frequently block your attack against the targets on the ground.

When you have reached the 17th level of the game (there are 32 levels in all) the

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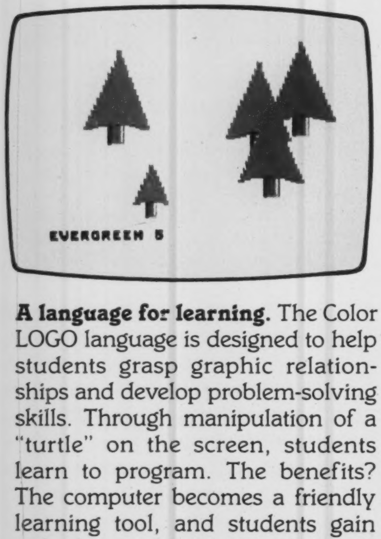

A language for learning. The Color LOGO language is designed to help students grasp graphic relationships and develop problem-solving skills. Through manipulation of a "turtle" on the screen, students learn to program. The benefits? The computer becomes a friendly learning tool, and students gain valuable insight into advanced mathematical, geometric and logical concepts through hands-on experimentation.

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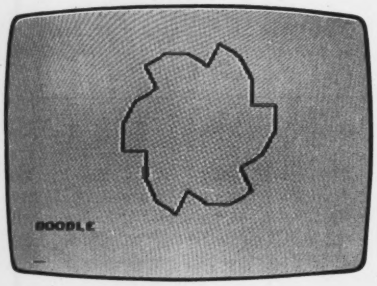

Simple animation is a snap. The Color LOGO turtle can be changed into a variety of different shapes. Thus, students can create their own animation simply by redefining the turtle's shape as it moves.

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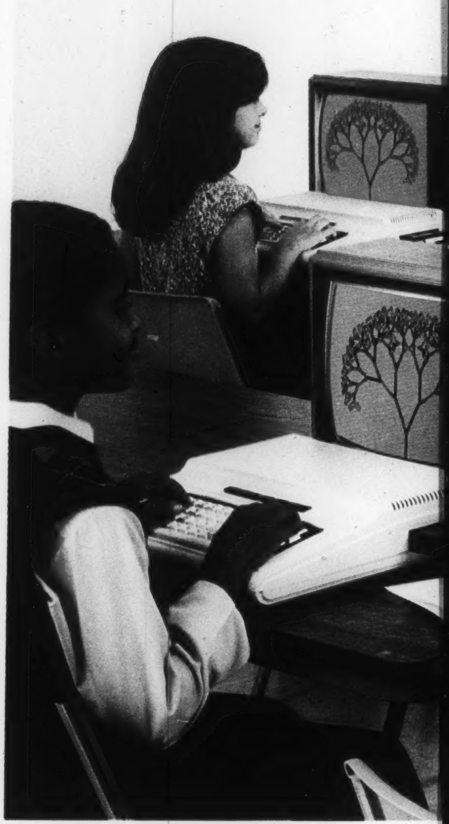

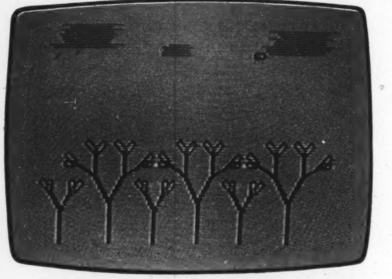

LT = left
HATCH
RT = right
BG= background
HT= hide turtle
BK=
ST = show turtle
back
PD = pen down

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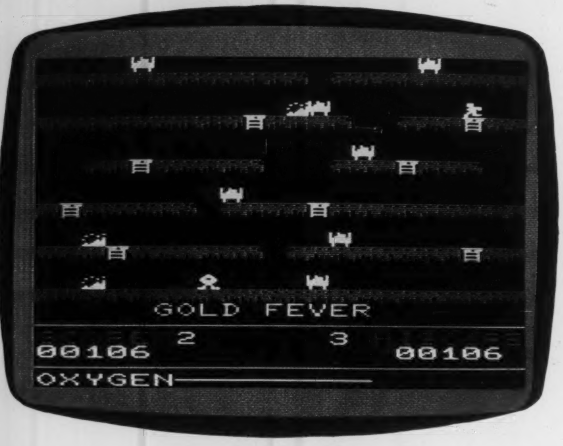
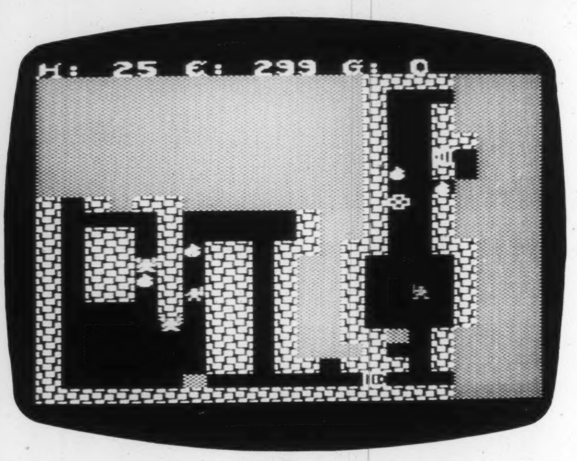


Gold Fever



Sword of Faragoal

speed of the game is doubled, making it twice as hard to avoid the perils in the sky and throwing off the timing you learned in the previous 16 levels. Of course, if you have made it this far, you will probably catch on quickly, and you will certainly have won extra helicopters to carry on the battle (one extra is awarded for every 10,000 points scored).

Deadly Skies is a great action game requiring quick strategic decisions and even quicker reflexes. The graphics are good and so are the sound effects which, though not elaborate, do enhance play. Once you get your hands on it, you will find it pleasantly addictive. Just remember to dodge those smart bombs and keep your thumb glued to the fire button. *—BJM*

Gold Fever

creative computing

SOFTWARE PROFILE

Name: Gold Fever
Author: Corey Ostman
Type: Single player arcade
System: Vic 20
Format: Cartridge
Language: Machine Language
Summary: Entertaining vertical maze game with great graphics, sound.
Price: $39.95
Manufacturer:
Tronix Publishing
8295 South La Cienga Blvd.
Inglewood, CA 90301

Deep, deep in the heart of your Vic 20 computer a treasure is waiting, a motherload of gold ore. A fortune in the yellow metal is ready and waiting for the first adventurer willing to brave a gauntlet of careening ore cars, crazed claim jumpers, and runaway boulders.

If that kind of treasure hunt appeals to you, you will enjoy *Gold Fever*, a cartridge game in high-resolution color authored by Corey Oatman for Tronix. *Gold Fever* is a fast moving arcade game played on tiers and levels, in the great tradition of *Beer Run, Donkey Kong, Apple Panic*, and *Miner 2049er*.

As the game begins (with a brisk electronic rendition of "My Darling Clementine") you find your miner on one of the uppermost tiers of the mine. Scattered around the five levels of the mine are little piles of gold. Using a joystick, you can maneuver the miner toward the gold and pick it up. To move your miner safely from level to level you steer him up or down the vertical shafts in the floors.

Of course there are a few little complications, such as runaway ore carts, which interfere with your miner's progress by knocking him flat. Three such collisions and you run out of miners, ending the game. But don't despair; like all good heroes of multi-tier arcade games, your miner will be able to jump over the obstructions—if you time the jumps perfectly. This saves the miner's skin and adds from 30 to 40 points to your score. If your miner is nimble enough to cross a chasm by running across a boxcar, he earns another 20 points.

Your miner's troubles also include having to jump over a lunatic claim jumper who will, from time to time, ambush and mug our hero. The best way to handle this guy is to jump right over him, the same way you jump over the runaway boulders. Didn't I mention the boulders?

They are what makes that odd, ominous rumbling noise while you are trying to concentrate on avoiding ore carts and maniac claim jumpers. Moving from one tier to the next before the rocks appear on screen doesn't help you evade them; they always appear on the same tier as your miner. The only thing that helps is to learn to time your jumps.

Once you have collected all the gold on the screen, you can make a run for the exit at the lower left of the screen and begin the process on the next level. Each of the nine levels, of course, becomes increasingly difficult as you go along. You must collect more gold on each succeeding level, the obstructions are faster, and as a result you must change the timing of your jumps. By the way, remember not to slow down your miner's action while you study the terrain. The oxygen supply is limited, and slow-moving miners tend to suffocate.

Gold Fever mixes great graphics with fine musical and sound effects and fast arcade action. It is a combination that results in great entertainment and great fun. *—BJM*

Sword of Faragoal

"The Protectorate Sword was forged, it is told, in the fires of the gods. Kept sheathed in the massive stone floor of a temple in the center of Ferrin, the sword protected the Great Forest from evil for countless years. When wielded against an evil hand, the enemy is surely defeated."

In *Sword of Faragoal*, the player must recover the renowned blade from a dungeon where it has been hidden by an evil wizard. There it can no longer protect the land, and the wizard is free to implement his diabolic schemes.

The player is rated in two main characteristics which improve with his experience level, a numeric measure of his

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SOFTWARE PROFILE

Name: Sword of Faragoal

Type: Fantasy

Author: Jeff McCord

System: Vic 20 with 16K expander

Format: Cassette

Summary: Fast-paced entertainment

Price: $29.95

Manufacturer:

Epyx/Automated Simulations, Inc.
1043 Kiel Ct.
Sunnyvale, CA 94086

accomplishments in the dungeon. These characteristics are "maximum hits,'" the amount of damage that he can take before dying, and "battle skill," his ability to fight.

The dungeon, which consists of twenty floors, is randomly determined every game. Each level occupies a single screen and is displayed as an aerial view as in *Temple of Apshai*. The player's character, monsters, stairways, sacks of gold, treasure, traps, and temples (sanctuaries where the player can offer gold) are likewise shown in colorful illustration.

When play begins on a level, unless the player has a magic map, the dungeon is dark everywhere except the area within the radius of his torch light. Therefore, other rooms must be explored to uncover their contents. Previously entered areas remain alight.

> ***Sword of Faragoal is fast-paced for a fantasy game because of its radical (but welcome) alteration of traditional fantasy rules.***

Movement is controlled by joystick, and the eleven special commands, which include drinking a healing potion or casting any of the five spells (invisibility, teleport, regeneration, shield, and light), climbing stairs, and burying gold are executed via the Vic keyboard.

Sword of Faragoal is a streamlined fantasy game that emphasizes graphics, ease of input, and real-time situations rather than a complex plot. Hence, it may appeal to those who do not care for traditional, intricate fantasy games.

The game uses definitive and crisp graphics. For example, the dungeon walls are not represented by the solid bars that similar games offer but instead by rocky patterns. This and other features such as the gothic text set enhance the atmosphere of the game. In addition, the player may choose background and foreground colors to suit his taste.

Sword of Faragoal is fast-paced for a fantasy game because of its radical (but welcome) alteration of traditional fantasy rules. A character's experience level may rise two or even three times while he explores just one level of the dungeon.

One of the few weaknesses in this game is the lack of player interaction during combat. The player merely moves his character near a monster and watches the message window. I realize the game is meant to be streamlined, but I would like to be able to specify my actions when my life is at stake. Moreover, the game has no sound effects.

Nevertheless, *Sword of Faragoal* has several outstanding points. It is one of the few games for the Vic that devotees of both fantasy and action games can enjoy equally well. —*SW* ☐

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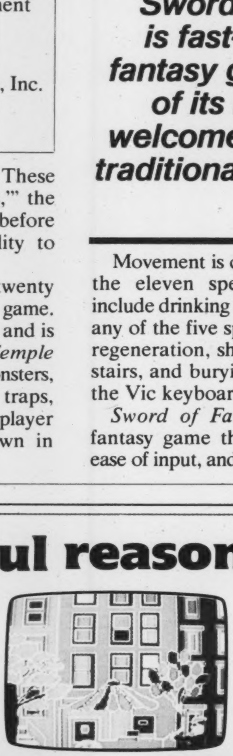

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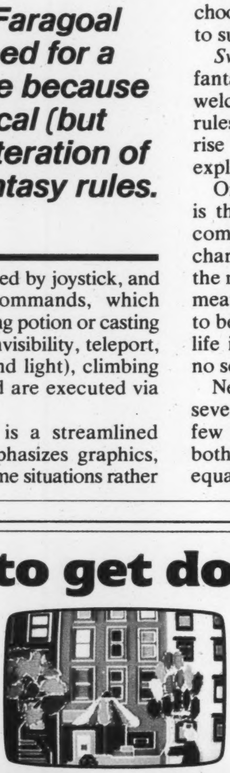

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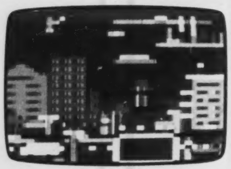

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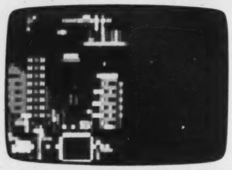

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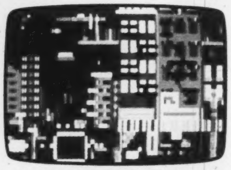

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Six Games for the JR-200

David and James Grosjean

This collection of six packages for the Panasonic JR-200 includes three educational packages from Instant Software and three arcade games from TMQ Software.

Geography Explorer: USA

Geography Explorer: USA is a quiz game about the states of the U.S.

After a very impressive title page showing the American flag in full color in the rough shape of the USA with "America the Beautiful" playing in the background, the menu displays nine options. The quiz subjects are in options 1-7: names, capitals, areas, populations, flowers, birds, and abbreviations of the 50 states. Option 8 gives all this information on any state you specify, and option 9 lets you quit.

After choosing the quiz subject, you must decide on the quiz type: 1) multiple choice (three choices); 2) the computer gives a fact; you answer with the state; 3) the computer asks a question; you type in the answer (spelling counts!).

The U.S. map is then displayed, and you must choose the region for your quiz: Pacific, Southwest, Rocky Mountain, Midwest, Southeast, Northeast, and New England.

The map of this region is displayed at the top of the screen and the questions at the bottom. If you answer a question incorrectly, you get two more tries (only one more try in the multiple choice mode).

> ***Geography Explorer: USA makes good use of color graphics and music to lead the player through the quizzes.***

When you give the correct answer, a few bars of "Yankee Doodle" are played. After nine correct answers, the entire song is played. When you finish the region, your score is calculated. If you score over 75%, the screen is drenched in a variety of colors, and you get several screens of "good good good." If you score 100%, a colorful balloon floats across the screen.

The documentation includes a brief description of the content of the game including score sheets and an eight column chart showing all the information for each state.

The major drawback of the program is that it quizzes mostly on information of limited usefulness such as population, area, state bird and flower. Since the program is in Basic, the quiz content could be changed, but the documentation

creative computing

SOFTWARE PROFILE

Name: Geography Explorer

Type: Educational game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Makes good use of color graphics and music to lead the player through the quizzes.

Price: $24.95

Manufacturer:
Instant Software
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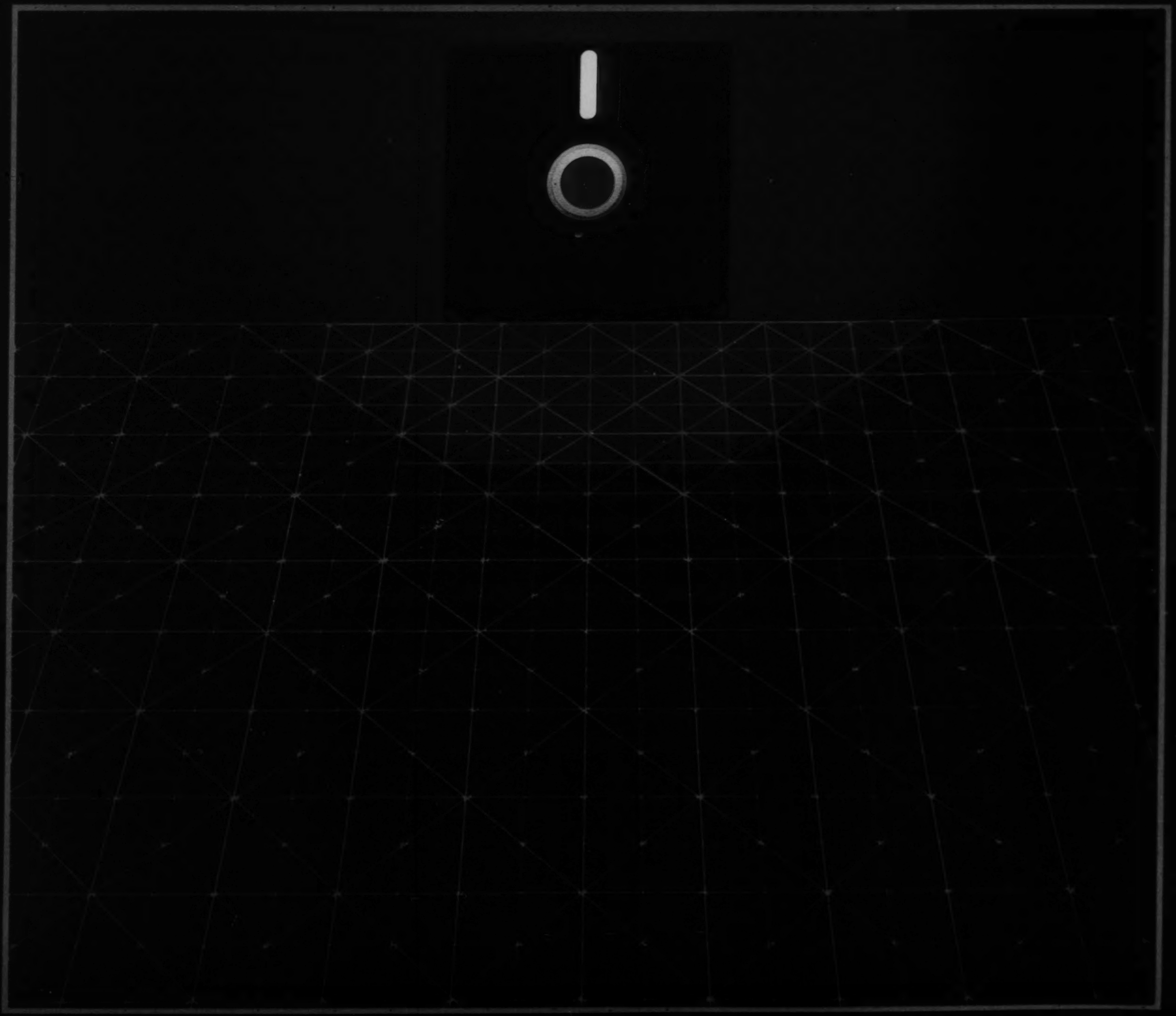

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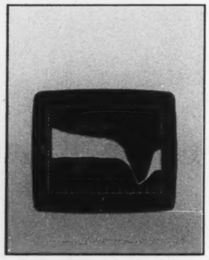

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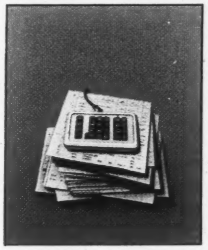

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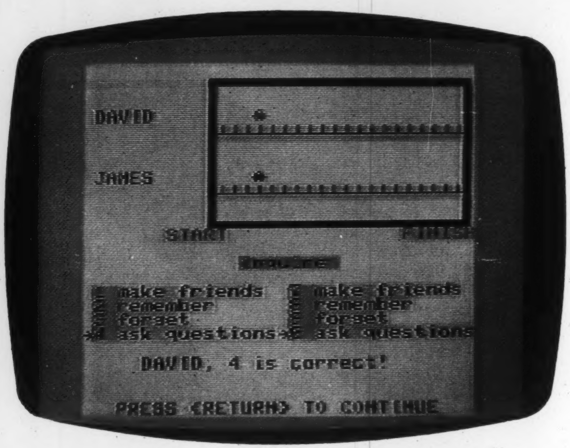
Geography Explorer: USA



```
DAVID
JAMES
   START                    FINISH
            inquire
1 make friends     5 make friends
2 remember         6 remember
3 forget           7 forget
*4 ask questions  *8 ask questions
      DAVID, 4 is correct!
  PRESS <RETURN> TO CONTINUE
```

Wordwatch

does not indicate how. Furthermore, it does not make use of the hi-res capabilities of the JR-200 in the map drawing. One minor point: Delaware is misspelled!

Geography Explorer: USA is user-friendly and encourages the player at each step. In general it makes good use of color graphics and music to lead the player through the quizzes. It is an enjoyable game, and it has the possibility of being a good teaching tool if more useful information were included.

Wordwatch

Wordwatch is a package of four programs dealing with vocabulary and spelling.

In Word Race two players race their cars across the screen by correctly defining a series of words. The first word is given along with two identical columns of definitions—one column for each player. The first player to enter the correct answer advances one unit toward the finish line. If the answer is wrong, he backtracks one, and the other player gets a chance to answer. Then the next word appears and so on. This is a rather exciting and engrossing game which uses good graphics. The vocabulary is about junior high level.

In Hide 'n Spell, after choosing one of four levels of difficulty, you enter your name and the amount of time you need to find the misspelled word in a list of four. The timer counts down from 100 by fives. When you pick the misspelled word, the timer stops. You get half the points on the timer for finding the misspelled word and the other half for spelling it correctly. At the end of the game, your score card is displayed. Then a note from the JR-200 is shown encouraging you to keep trying. The vocabulary is about junior high level.

creative computing

SOFTWARE PROFILE

Name: Wordwatch

Type: Educational game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Useful educational tool for up through junior high

Price: $19.95

Manufacturer:
Instant Software
Rt. 101
Peterborough, NH 03458

Spelling Bee is quite different from the other three. You type in the words you want to be tested on (up to 40). After each word, the computer beeps, turns on the tape recorder, and gives you six seconds to say the word clearly to be recorded onto a blank tape. When you are finished, the computer instructs you to rewind the tape and press PLAY. The computer turns on the tape recorder, plays a word, and asks you to type it out on the computer. If you spell it wrong, the computer gives you three tries and clues to help. This program is very effective in simulating the spelling test situation.

The last program, Spelling Tutor, tests you on up to 50 words, which you enter. The game starts by asking you to say each word out loud one by one. The letters of each word are scrambled, and you must spell the word correctly. Next, the words are presented with asterisks replacing some of the letters, and you must supply the missing letters. If you need help, the computer will reveal a missing letter. In the last exercise, some of the vowels are replaced with random vowels, and you must correct the words. This program is the least effective of the four.

The package would be most useful up through junior high. The latter two programs have the advantage of user defined lists. The lists in the first two could be changed, but this would not be easy.

Typing Teacher

Typing Teacher intends to teach you how to type.

The main menu gives you eight options. The first is an introduction to the home base keys and the way the tests work. The top half of the screen shows a hi-res picture of the keyboard, which remains on the screen during the test. Only the keys you have learned are labeled. After you are shown the base keys, you are tested on them. The tests are like the tests in most typing manuals: you must copy a list of the keys you have just learned in groups of two or three keys.

The next five options apply the same method to the different rows on the keyboard. When you choose one, the row is labeled, and you are shown which finger goes to which key. The first part of each lesson drills you on moving your fingers from the home keys to the new keys; the second part drills you on the new keys with real words. You must copy the text given *exactly* and you cannot use the back arrow or the rubout. The computer then tells you how many characters you got correct and in the correct place.

The "advanced" level option has three parts: 1) special character drill including punctuation marks and common computer symbols in Basic sentences; 2) some common words, which are in sentences;

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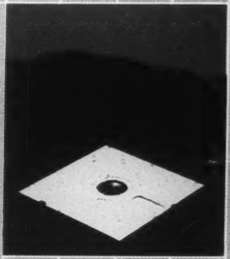

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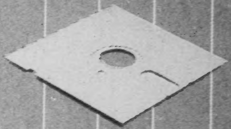

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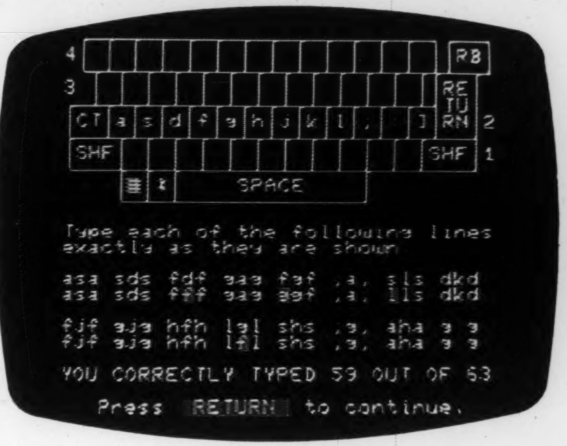


```
Type each of the following lines
exactly as they are shown

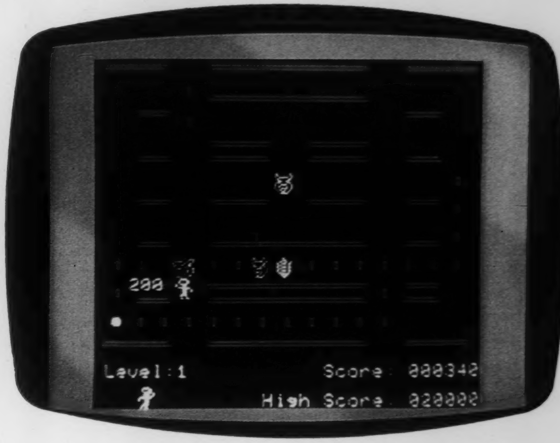
asa sds fdf gag fgf ;a; sls dkd
asa sds fff gag ggf ;a; lls dkd

fjf gjg hfh lgl shs ;g; aha g g
fjf gjg hfh lfl shs ;g; aha g g

YOU CORRECTLY TYPED 59 OUT OF 63

     Press  RETURN  to continue.
```

Typing Teacher



Pig Pen

3) the bottomless page which lets you type on your own. The drills work the same.

creative computing
SOFTWARE PROFILE
Name: Typing Teacher
Type: Educational program
System: Panasonic JR-200
Format: Tape
Language: JR-200 Basic and machine code
Summary: Useful primarily as an introduction to typing on the JR-200.
Price: $24.95
Manufacturer:
Instant Software
Rt. 101
Peterborough, NH 03458

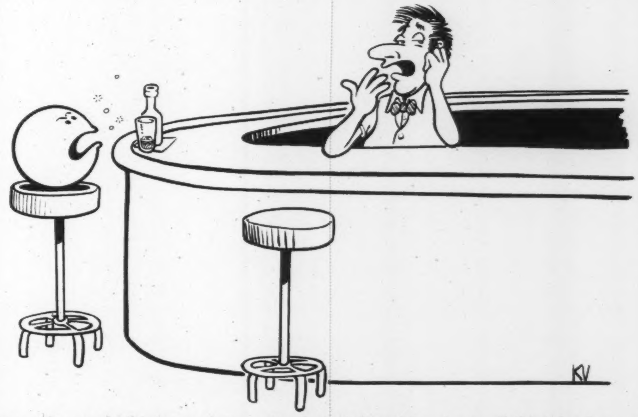
The main drawback to this program is that it is tailored to the JR-200, so switching to a typewriter requires some adjustments because the JR-200 has a Chiclet style keyboard and the characters on some of the keys are different from a typewriter. One of the biggest differences is the extra column of keys between the RETURN key and the semicolon key. This makes for an unreasonable stretch for the pinkie to reach the RETURN key. When typing at faster speeds, we experienced a little key bounce, i.e., double letters and, when using shifted keys, both the shifted and unshifted characters appearing on the screen. Another drawback is in the tabulating of mistakes. There is no grand total, only the total of mistakes after a line or two. Also, there is no timer to see how many words per minute you typed. You must time yourself using the bottomless page and find your own mistakes.

All things considered, this program is useful primarily as an introduction to typing on the JR-200. If you seriously want to learn to type, a typing book and a typewriter are much better.

Pig Pen

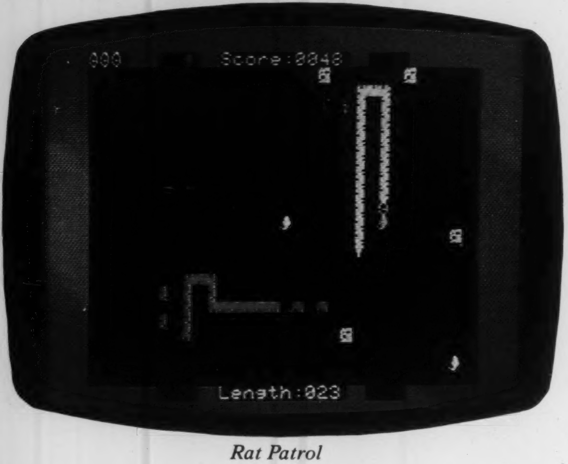
Pig Pen is a game of the Pac-Man type. In this variation you try to fill the screen with dots while avoiding the deadly pigs. It is more difficult than Pac-Man because the maze is far simpler (fewer places to run), the pigs are very intelligent, and you do not move any faster than they do. The game can be played with either the keyboard or a joystick; we found the joystick preferable.

When the tape loads, a cute title screen appears while "Old MacDonald" is played. The screen shows your score, the high score, the level number, and the playfield.

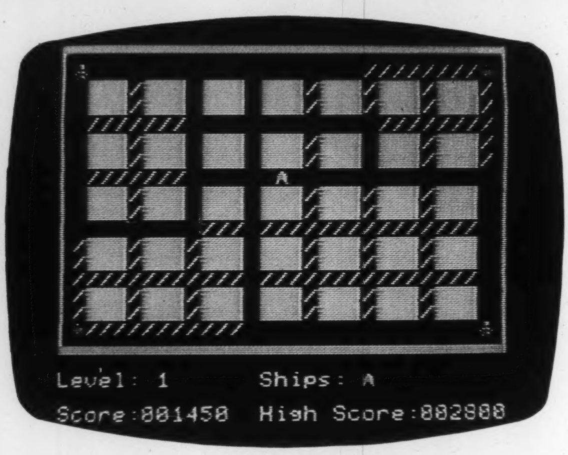


...yeah sure it sounds (hic) easy, but you try being chased by ghosts all (hic) day long... and for what?... for all the blasted dots I can (urp) eat... I tell you if I have to look at another dot...

creative computing
SOFTWARE PROFILE
Name: Pig Pen
Type: Arcade game
System: Panasonic JR-200
Format: Tape
Language: JR-200 Basic and machine code
Summary: A simple yet intriguing and challenging variation of the Pac-Man type, but weakened by slowness.
Price: $29.95
Manufacturer:
TMQ Software, Inc.
82 Fox Hill Dr.
Buffalo Grove, IL 60090
(312) 520-4440



Rat Patrol



Galactic Chase

As soon as you move your humanoid (Old MacDonald?), all four pigs emerge from the pen simultaneously.

Since you are outnumbered and your speed is the same as that of the pigs, you are easy game for them. Luckily though, you can drop energizers in the corners of the playfield. These allow you a short period of time during which you can eat the pigs. When eaten, the pigs return to their pen in the form of ham butts, only to reemerge after your invincibility period expires.

You start with three lives; bonus lives are awarded every 10,000 points. Eating pigs (scored as in Pac-Man) and corn cobs builds your score more quickly than dropping dots for 10 points each.

One feature of this game is the use of the unused portion of the screen to tell you what is happening, e.g., when you drop an energizer, colors flash to tell you that you can eat the pigs. When you fill the screen, colors scroll up this area. Another feature is that even after the energizer period has ended, you have one or two seconds to eat one more pig.

This game has four problems. 1) It gets quite difficult after about only four screens because of the pigs' intelligence and short energizer periods. 2) The slowness, even at the high levels, often makes the game frustrating, if not boring. 3) It does not accept a name or initials in setting a new high score. 4) The flicker of the ham butts passing through you on their way to the pen can be very distracting.

The game does have some advantages. 1) It is easy to start a new game; pressing BREAK gives the option of beginning a new game or quitting. 2) The graphics and music will probably appeal to players of all ages. 3) Although the game could be improved in several ways, it is a simple yet intriguing and challenging variation on the Pac-Man theme.

Rat Patrol

Rat Patrol is a game similar to the Apple computer game *Snake.* You are a snake, and you try to gain points by eating up rats without losing your three lives. The more you eat, the longer you get until you shed your skin. You control the snake's head while the body follows its path. The game can be played using either a joystick or the keyboard.

After loading is partially complete, a nice title screen is displayed. Once loaded a short piece of music is played while the computer waits for you to press a key to start the game. On the screen are shown your score, your length (number of characters long), and a lives-remaining indicator.

You start at the left side of the screen and immediately begin moving to the right. A life is lost by touching anything other than rats, including the screen edges. At every 200 points the game speeds up and another life is awarded. When your length reaches a certain maximum, you shed your skin. The shed skin becomes purple, and you revert to your original length.

The rats move somewhat randomly and are not difficult to catch because they move slower than you do. However, they will lure you into death traps (situations in which you have no place to move because your own body prevents it) unless you are careful. Rats, as well as pieces of cheese, are replaced when eaten. When a rat eats a piece of cheese, it turns purple and heads toward a rat hole where it will revert to its normal status. Purple rats increase your length more than normal rats. The rats cannot pass over your body, but they can pass over a shed skin, eating up portions of it in the process. Therefore, you can force them to eliminate skins by herding them to the desired locations.

When the game ends, the new high score is displayed. The computer will ask if you want to play again; if not, the program is erased.

The only problem we found with *Rat Patrol* is that it does not accept a name or initials when a new high score is set. It is easy to play, and yet it requires a great deal of strategy and technique to play well. The sounds, graphics, and color give the game a great appeal. All in all, it is a simple, yet highly enjoyable game.

creative computing

SOFTWARE PROFILE

Name: Rat Patrol

Type: Arcade game

System: Panasonic JR-200

Format: Tape

Language: JR-200 Basic and machine code

Summary: Easy to play, yet requires a great deal of strategy and technique.

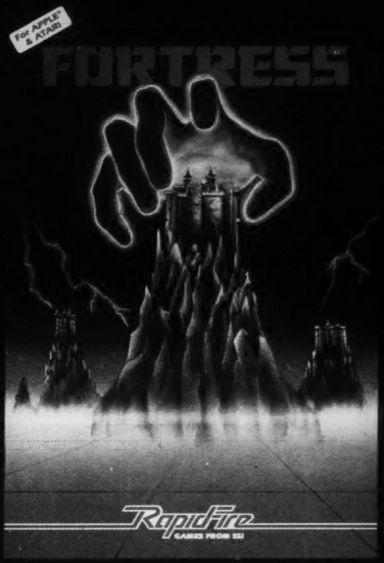
Price: $29.95

Manufacturer:
TMQ Software, Inc.
82 Fox Hill Dr.
Buffalo Grove, IL 60090

Galactic Chase

In *Galactic Chase* you are set in the middle of a game area similar to that in Figure 1. You must clear the screen of slashes (Pac-Man style) while avoiding the four aliens which are trying to destroy you.

A beautiful title screen is displayed after loading is partially complete. When the loading is finished, the title screen



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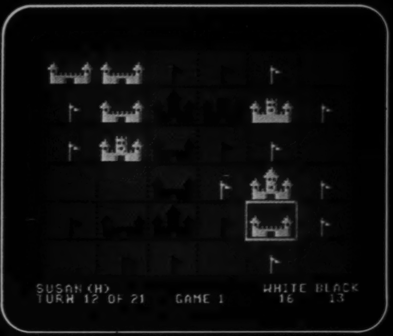

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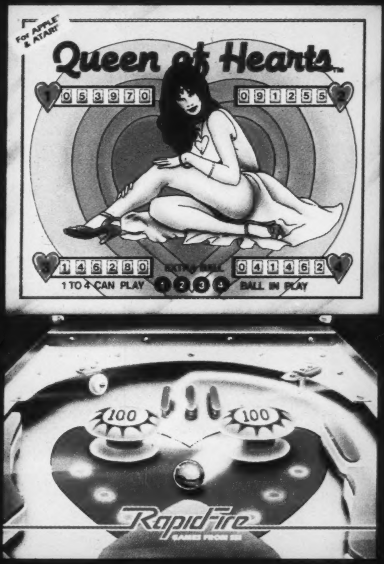

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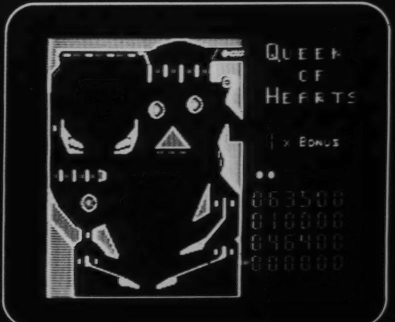

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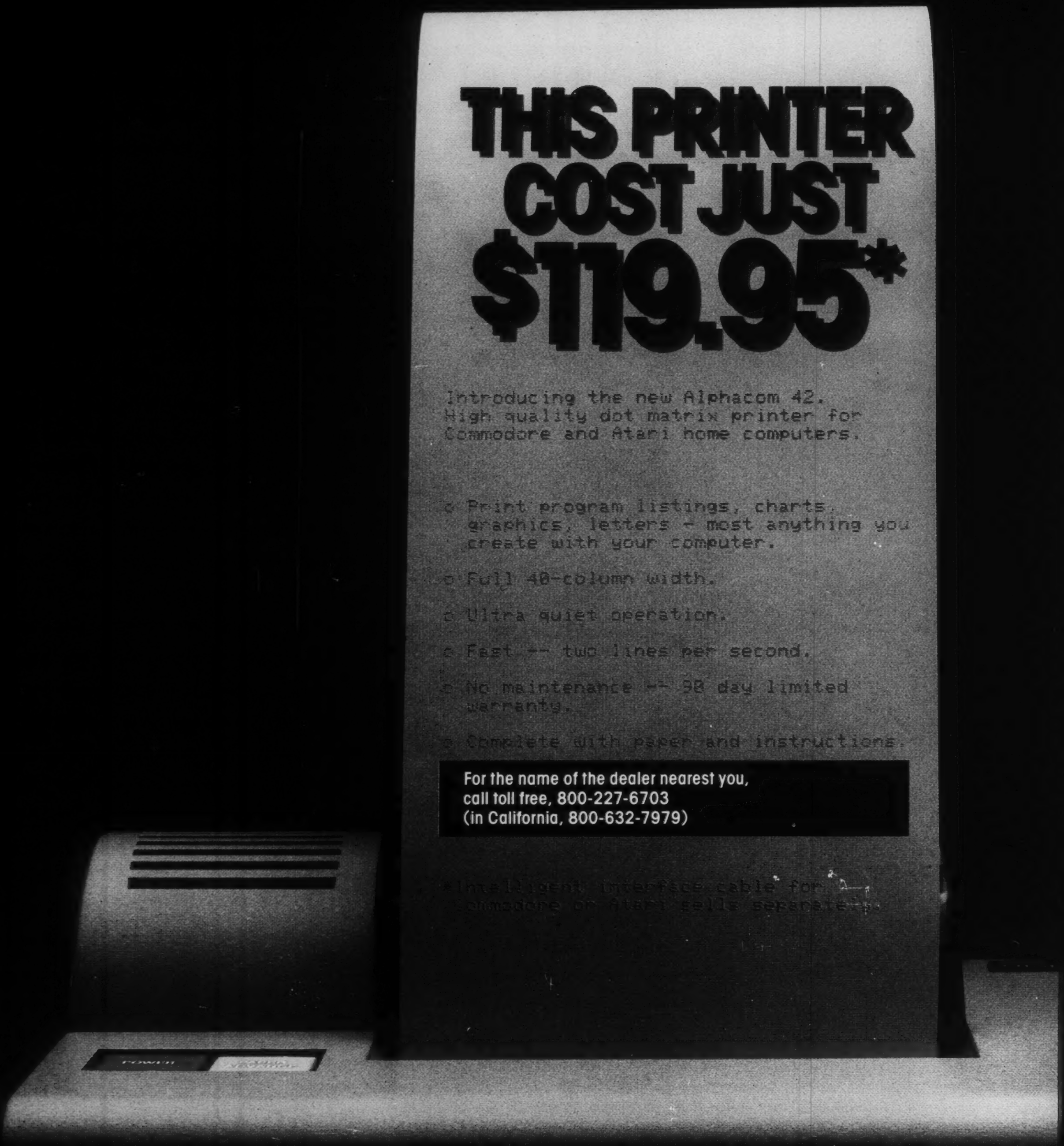

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JR-200 Software, continued...

creative computing
SOFTWARE PROFILE
Name: Galactic Chase
Type: Arcade game
System: Panasonic JR-200
Format: Tape
Language: JR-200 Basic and machine code
Summary: The graphics and sound are good; at high levels it has the speed of arcade games; excellent fun.
Price: $29.95
Manufacturer:
TMQ Software, Inc.
82 Fox Hill Dr.
Buffalo Grove, IL 60090

turns green and instructions are given on the point values, the controls to use, and other information. The computer then asks for a skill level selection from 1 (slow) to 9 (very fast).

At the start and after you lose a ship, the four aliens of randomly determined types appear at the corners of the screen. They will not move until you move. When you shoot one of the aliens, a replacement of the same type appears at one of the corners or in the center. Each type of alien has its own attack patterns, and the touch of each is deadly. The red aliens are very aggressive, while the green ones are quite shy.

When the screen is cleared of slashes, the remaining four aliens must be eliminated. At this stage no replacements appear. Once they are taken care of, the entire screen scrolls off the left side, and another screen appears, this time one skill level higher.

When your four ships are all gone, the game ends, and the final statistics are displayed. These include the new high score, your end of game score, and the skill level you attained.

The game has several disadvantages. 1) Without a joystick it is difficult to play because the keyboard layout makes using the four arrow keys and the space bar awkward. We used a regular switch-type joystick, and the game played well. In fact a joystick can be used with all three of these games. 2) The game cannot be stopped in the middle to start a new game with a different skill level. 3) The final problem is that it does not accept a name or initials when a new high score is set.

Of the three arcade style games *Galactic Chase* is clearly better than *Pig Pen* and a tossup with *Rat Patrol*. The graphics and sound are good. At the high levels, it has the speed of a good arcade game. The game is excellent fun, challenging to your quick thinking and reflexes, and highly addictive. ☐

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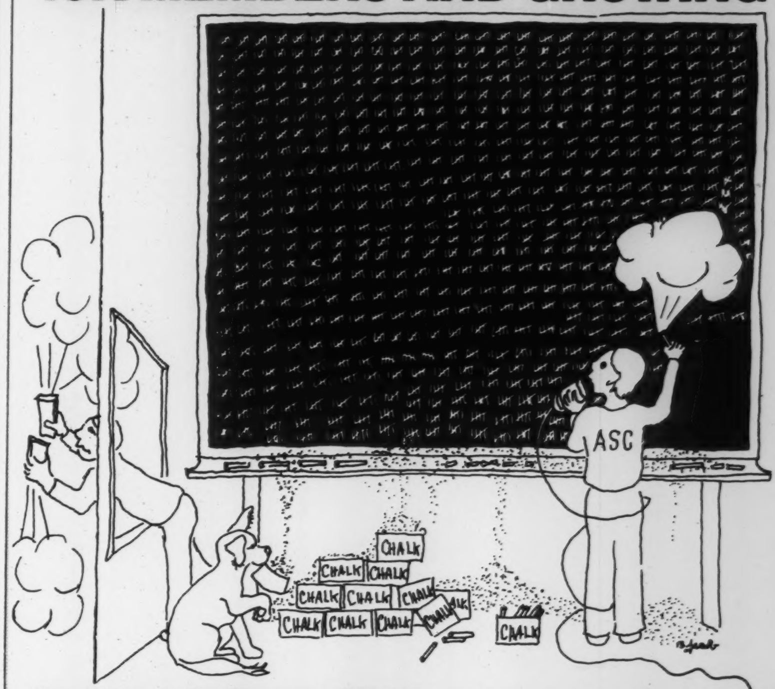

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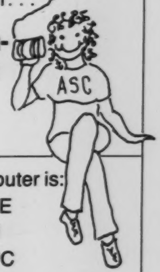

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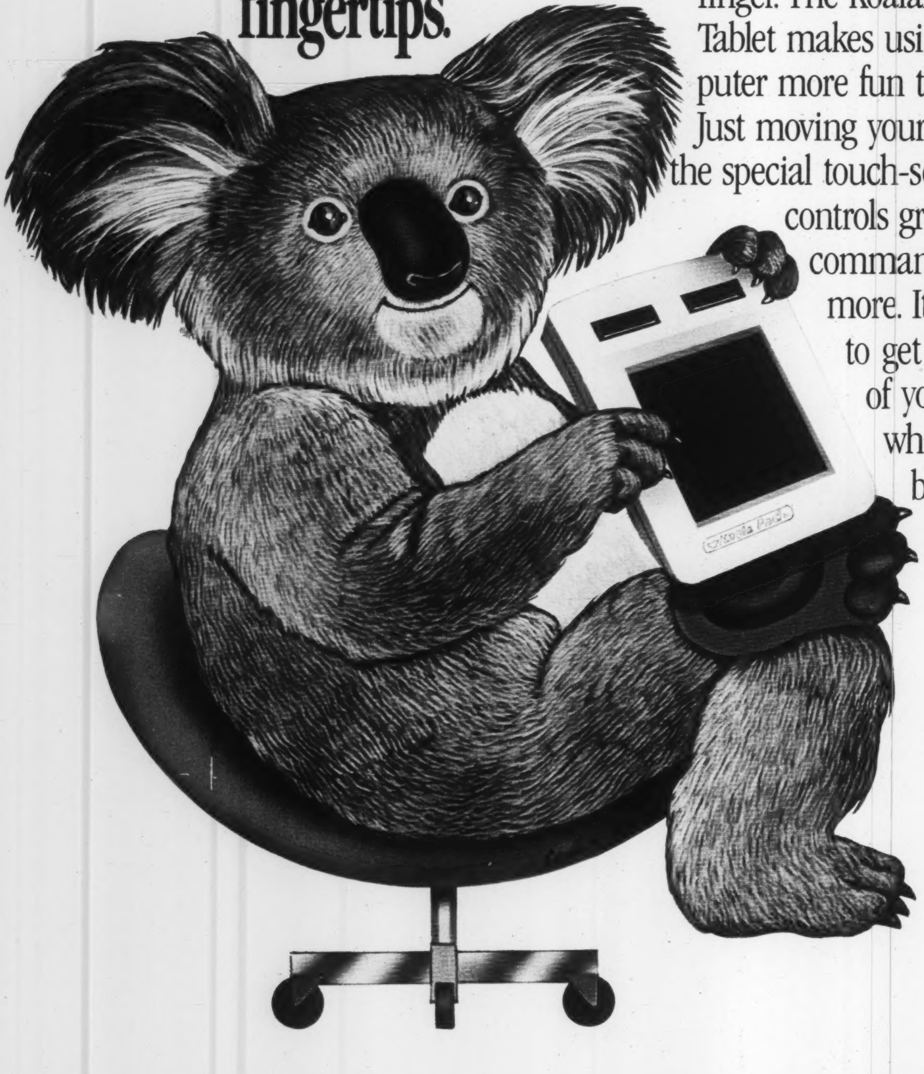

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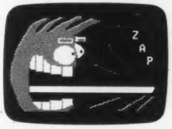

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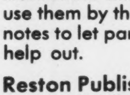

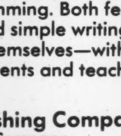

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SIGGRAPH '83

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The Graphics Event Of The Year

Tim Onosko

In an industry where a year can span two generations of development, the sheer longevity of an annual event like Siggraph is enough to qualify it as a "classic." For those unfamiliar with the word, Siggraph stands for Special Interest Group for graphics, part of the professional group, the Association for Computing Machinery. And, as computer graphics have become increasingly important to computing, so has each year's Siggraph conference.

Siggraph is a unique gathering of computer scientists, engineers, and artists. One part of the event is its serious side: The introductory courses in computer graphics and the presentation of papers and examples of work in technical sessions. These cover diverse topics, from office automation and computer aided design/manufacturing (CAD/CAM), to film special effects and animation. Another important element of Siggraph is its exhibition of computers and systems—most of them at prices far beyond the reach of almost every individual in attendance.

Though the talk is often technical and the pricetags large, Siggraph still retains a heavy emphasis on art and artists. The recent addition of a large and impressive art show reinforces that emphasis, as do the annual shows of computer-generated film and video works. Siggraph is still very much an event in which jeans and t-shirts seem as appropriate as business suits and ties.

Most significantly, however, Siggraph is a place to see and hear about the future. Many of the ideas and much of the technology showcased here will eventually reach our own homes, one way or another.

This year's Siggraph computer graphics conference was held from July 25 to July 29 in Detroit, MI. Here are some impressions taken from it.

About 600 people showed up at the first Siggraph conference, held in Boulder, CO in 1974. Since then, attendance has climbed to over 17,000 in 1982. (Attendance was down in 1983 to about 14,500.) Some 1983 conferees proudly wore their veteran status on their chests in the form of badges, ribbons, and t-shirts from previous Siggraphs.

It was easy to play the "badge game" while walking Detroit's Cobo Hall convention facility. People came from around the world, from major colleges and universities, from industry and from the new glamour companies—the film studios and television production houses.

Despite the welcome diversity of people and topics at Siggraph, the conference is somewhat schizophrenic by nature. Some examples: One gentleman sent by his employer, the torpedo division of a major defense contractor, apparently wasn't told about the wide range of personalities to be expected, and was staggered by the counter-culture types wandering about.

Likewise, examples of sophisticated new imaging techniques on display during the evening film shows were greeted with loud boos and hisses when they came

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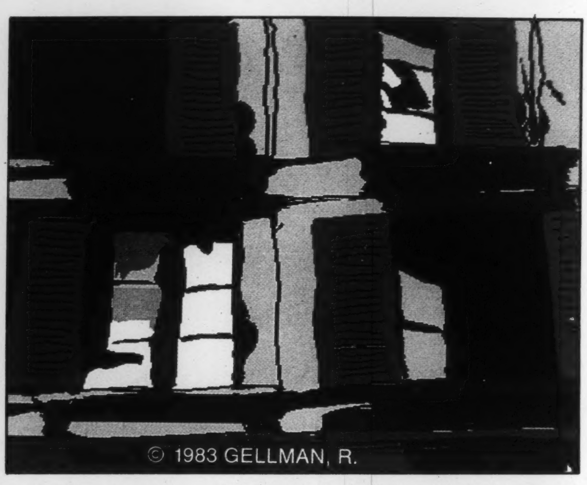
Tim Onosko, 1338 Rutledge St., Madison, WI 53703.

1983 COHEN, S.—ADVANCED TECHNOLOGY SYSTEMS



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from the defense community. And, while a group of artists argued that the randomness of real life must somehow be integrated into computer-generated film and art, an auto industry executive called for increased precision in the CAD systems used to design his cars.

The Microcomputer Role

Surpisingly, although microcomputers make up a major part of the computer industry, few were visible at Siggraph. In fact, no single aspect of the conference was oriented to microcomputers and their users. One attempt, an ad hoc call for those interested in small computers and the arts, drew several dozen people, but yielded little more than a session in which everyone introduced themselves and their interests, then broke up into disorganization. It was ironic, too, that few people in this meeting actually owned microcomputers. Many came out of curiosity; more than a few said they were artists looking for jobs.

The organizers of Siggraph would do well to consider an appeal to users of small computers, perhaps by establishing courses and events devoted to advancements in the micro field. Or would this add yet another disparate element to a conference with many already?

Courses And Sessions

According to a walking around poll, some courses and technical sessions were extremely well-received at Siggraph '83.

A two-day "Introduction to Computer Animation" featured speakers from the New York Institute of Technology, perhaps the most respected group involved in both two-dimensional and three-dimensional (solid-looking) animation. The group also included alumnus Alvy Ray Smith, one of the leaders of the Lucasfilm computer graphics project. In the past, Smith has delivered his in-depth talk about color theory. This year, he chose, instead, to speak about how objects can be mathematically described using a technique known as *splines*.

A new course, entitled "The Artist/Designer and Computer Graphics" boasted a similarly prestigious panel, including Dr. James Blinn, artist David Em, and Richard Taylor. It is Blinn who is responsible for the beautiful computer-generated movie visualizations of NASA's planetary exploration program, particularly the Voyager missions. (Without these, NASA would be practically without a public product to show, its spacecraft millions of miles away from earth.) David Em is an independent artist who uses Blinn's computers and software for his own work. Richard Taylor is an art director, film effects specialist, and computer animator best known for his work on Walt Disney Productions' *Tron*. Late of MAGI Synthavision, a computer animation company, Taylor has recently gone to Lucasfilm, where he is to work on *The Grid*, a film in preproduction there.

On the more practical side, a session on "Graphics in Office Automation" drew well, reflecting the increasing interest in using computers for constructing "information graphics" in management. This is obviously a topic that continues to yield new developments, including the use of laser printers with computers to establish a kind of electronic publishing industry.

Of the technical sessions, two on computer graphics in Japan drew well. These,

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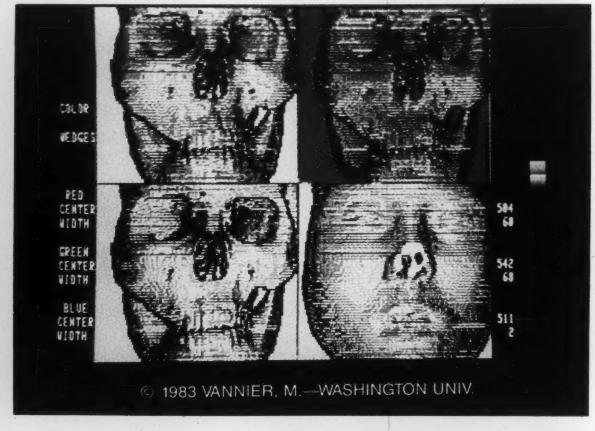

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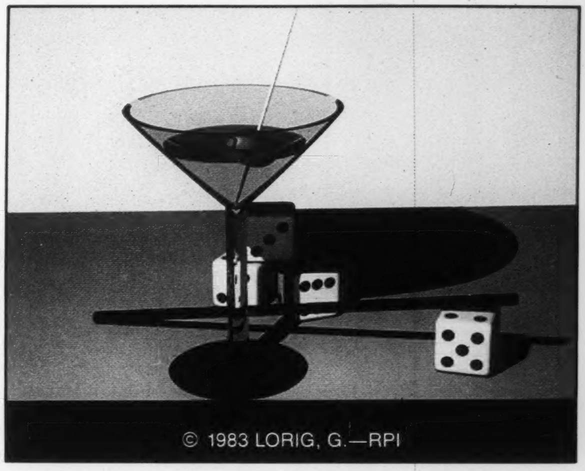
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organized by Laurin Herr of Pacific Interface, a company specializing in Japanese/U.S. corporate relations, included representatives of Japanese computer companies and artist Yoichiro Kawaguchi, famous for his fantastically organic computer-generated abstractions. More about Kawaguchi and his colleagues later.

Maybe the most intriguing topic discussed at the technical sessions had nothing to do with either art or commerce.

Maybe the most intriguing topic discussed at the technical sessions had nothing to do with either art or commerce. Radiologist Dr. Michael Vannier, plastic surgeon Dr. Jeffrey Marsh and James Warren of the McDonnell Douglas Aircraft Company outlined their pioneering techniques in the reconstruction of the human face using computer graphics and fabrication. Developed at Washington University Medical Center, the St. Louis Children's Hospital and McDonnell Douglas, it has already been used to plan corrective surgery for more than 350 patients whose deformities were caused by cancer, birth defects, or traumatic injuries.

Vannier, who was a NASA engineer before becoming a radiologist, uses CAT scan images to arrive at a 3-D image of the entire skull, inside and out. With these extremely accurate images, plastic parts can be fashioned and installed into the human head to replace bone and soft tissue lost because of surgery or missing by birth defect. This is a truly important medical technique and one that impressively demonstrates the potential of computer imaging systems.

On The Show Floor

Touring the Siggraph hardware show can be an agonizing experience. So much of it is unattainable on a personal level. This is a show for buyers with corporate backing. Many of the machines on display are image systems dependent on large mainframe computers for their operation. Indeed, this technology will trickle down to personal computer users, but, for now, is devoted to those who can afford it. Still, some products and companies stand out from the crowd.

Cray Research whose legendary Cray-1 supercomputer wasn't even on display, had a booth, but never really expected to sell a single machine. Cray computers sell for more than $10 million, and fewer than 50 are installed world-wide. Cray was there to remind people that realistic, three-dimensional images require the kind of massive computing power that only a Cray can deliver. (For example, a TRS-80 was recently benchmarked against a Cray-1. Result, the Cray performed approximately *1.6 million times faster* than the little Radio Shack machine.) The company distributed very nice, photographically-real portraits of its machine, generated, of course, by a Cray-1 at John Whitney, Jr.'s Digital Productions."Imagine what you could do with a Cray," suggested the headline.

At the other end of the scale were several graphics products for microcom-

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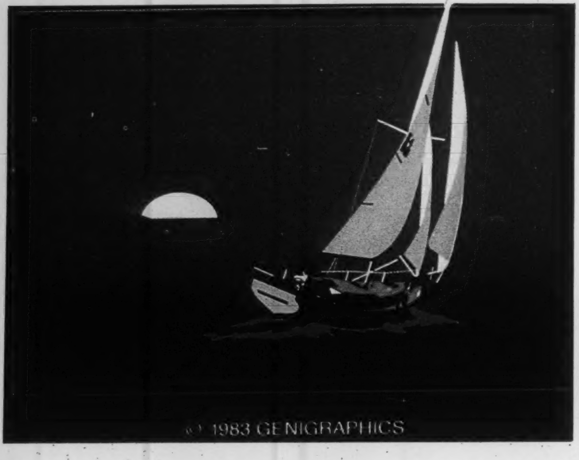

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puters. Most of these appear to be built around an increasingly popular microchip designed especially for graphics, the NEC 7220. Look to this chip to be used more and more in personal computer graphic displays. (Intel's American version of the chip, the 87220 is expected shortly and may be at the heart of IBM's rumored superior graphics board for the PC.)

Number Nine is a company whose name was inspired, according to a spokesman, by a Beatles song. It makes add-on graphics boards for the Apple II and the IBM PC. It offers resolution of up to 1024 by 1024 pixels per screen in up to 256 simultaneous colors selected from a palette of more than 16 million colors. It is priced at about $900 for the Apple version, slightly more for the IBM PC. Software, developed by Visual Data Enterprises for the system, is extra.

Another company, Cubicomp, introduced a high quality graphics system. Its model CS-5 is designed to calculate and display solid-looking screen graphics with a resolution of 512 by 512 pixels in up to 4096 simultaneous colors, or enough points and colors to produce pictures of photographic realism. Aimed at industrial and professional users, it is priced at about $9000.

Almost as impressive at about half the price is the Vectrix VX384. This is a true graphics subsystem, a box to which virtually any microcomputer can send data. At Siggraph, the Vectrix was demonstrated with an Apple workalike machine and a Kaypro portable with a hard disk drive. Screen images were very comparable to the quality of much more expensive systems seen on the exhibit floor. The resolution of the Vectrix is 672 by 480 pixels in up to 512 colors selected from a 16 million-color palette.

Where Was Lisa?

It was something of a puzzle why Apple Computer cancelled their exhibit booth; its Lisa is by far the best-known graphic microcomputer. (Apple was at Siggraph, though, recruiting for Lisa software designers.) This didn't mean that shoppers weren't reminded of Lisa. Several manufacturers showed Lisa-like "window" systems, including a company called Pixel and Sun Microsystems, who boasted that Lucasfilms had selected Sun for its graphic workstations. Pixel's machine, the Pixel 80G is an extremely powerful graphic computer system. Both companies use a fast and powerful 68000 microprocessor.

Several manufacturers showed Lisa-like "window" systems.

Pixel, which calls its machine a "supermicrocomputer" uses a vertically-oriented screen with the astounding resolution of 2048 pixels across by 4096 pixels down. Its black and white image is as close to a printed page as you are likely to see on a computer. Pixel's demonstration showed a line of readable type so small that it looked like nothing more than a blurred line, until you pressed your nose to the video screen. The Pixel 80 system will support two of these graphics terminals or 16 conventional terminals running under the increasingly popular Unix operating system.

Holography

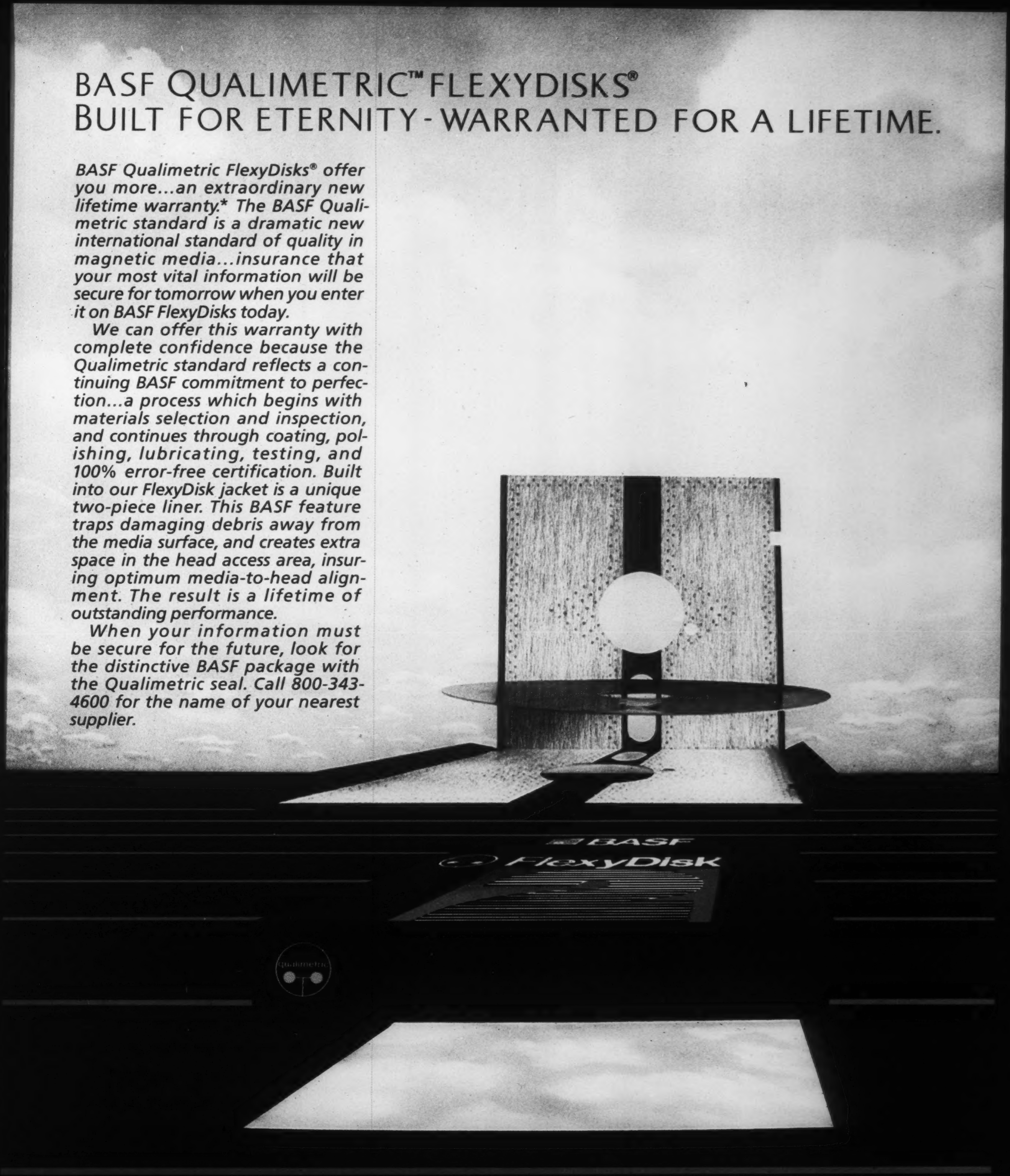
Some displays on the exhibit floor showed true three-dimensional graphics, not just shaded solids. A Southfield, MI company, Dimension Research, demonstrated an excellent hologram derived from computer-generated views. Lee Lacey, a veteran holographer, explained that this *image plane* hologram—appropriately a CAD-designed auto part—was produced from a series of discrete views drawn on a plotter and photographed on 35mm film. Other computer-synthesized holographic images by Chicago artists Dan Sandin and John Huffman were shown at the Siggraph art show.

Though the holograms at this edition of Siggraph were simple-looking line and wire frame images, it is obvious that synthesized pictures of greater detail and clarity are on the way. The marriage of holography and computer graphics seems a perfect one.

A group of San Rafael, CA artists and engineers insist there is no need to wait for holography to be further perfected. Lenny Lipton, a filmmaker and proponent of 3-D systems, is the prime mover behind the company, Stereographics, Inc., which includes Lhary Meyer, an electronics designer formerly with Lucasfilm. Stereographics' system is a simple one that alternates left- and right-eye images (two are needed for true 3-D on a video screen in rapid sequence.

The screen is viewed through glasses—more like goggles in the demonstrated version—containing electro-optical shutters synchronized with the screen by a wire connection to a black box. These are not mechanical shutters, but tiny electronic elements buried in the lenses of the glasses. A 3-D video system developed by Japan's Matsushita Electric worked the same way and is used in a video arcade game, SubRoc. But that earlier system suffered from distinct flickering, which Stereographics' system has eliminated.

The system works very well, despite an apparent reduction of screen resolution. Clips of new 3-D video material, microphotography, a segment from the 1953 3-D classic, *House of Wax* and a 3-D video game screen generated by an Apple computer were shown. (Lipton and company won't say how the flicker is removed, but there appears to be a modification in the number of lines actually scanned on the video screen.)



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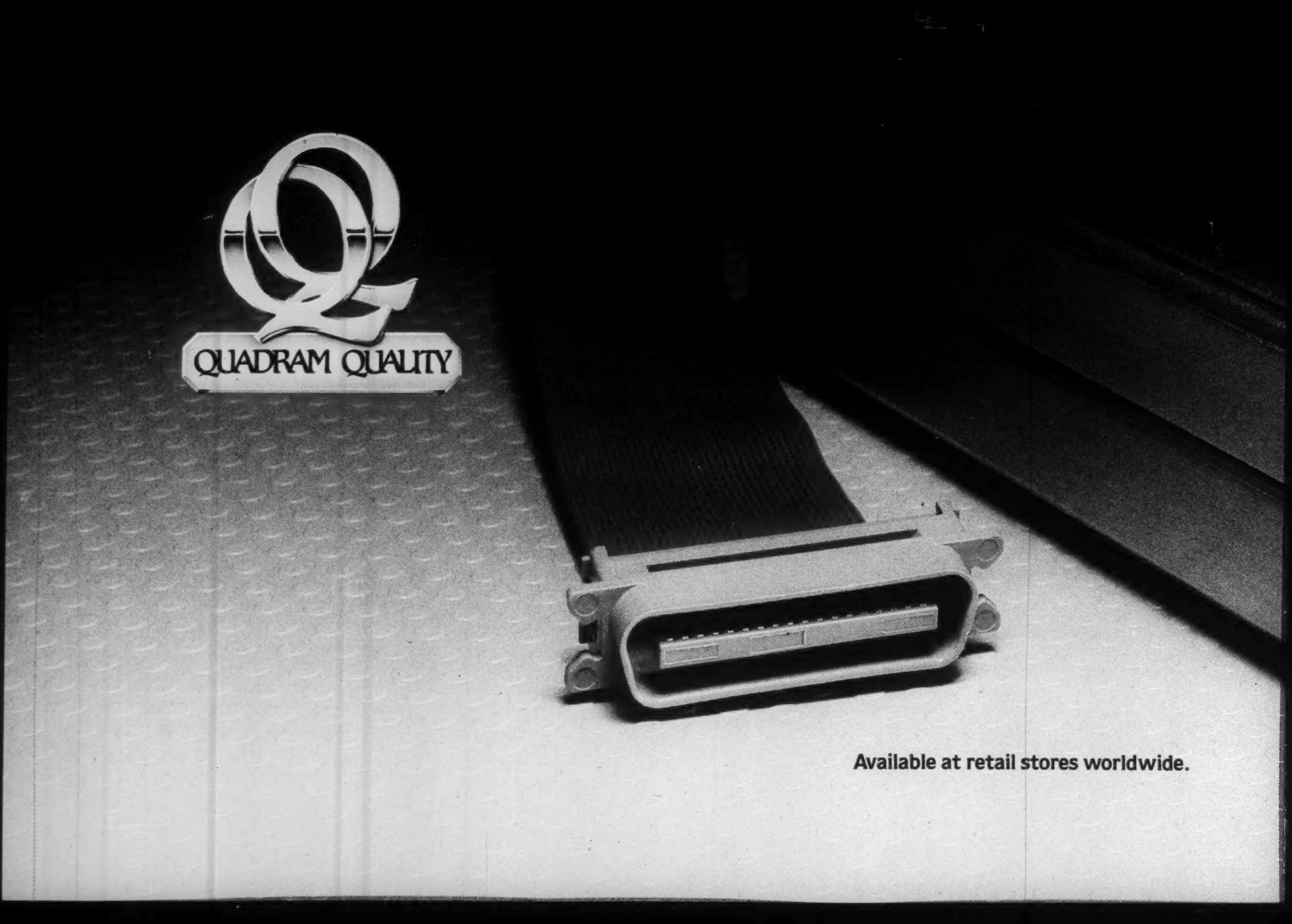

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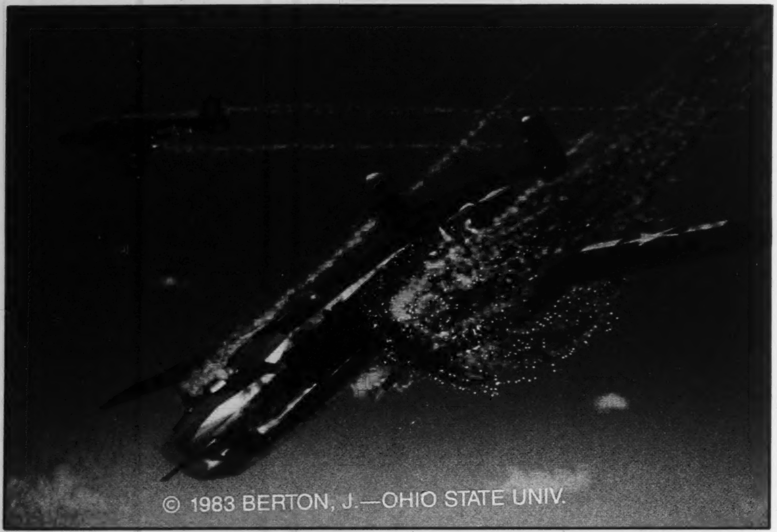

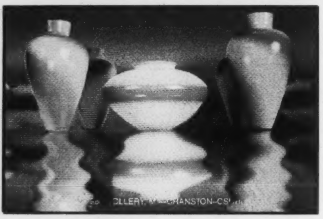

Lhary Meyer claims that the electronics—the black box—for signal processing and synchronization, and the glasses, can be manufactured cheap enough to make the system a consumer product. Furthermore, Lipton says the glasses can be made wireless by using infra-red light to synchronize the system.

If there was a dream system on display at the Siggraph exhibition, it was Images, offered by Computer Graphics Lab, Inc., the commercial arm of the New York Institute of Technology. Essentially, this is the same system that NYIT uses to produce its 2-D and solid-looking animation, and includes its famous Paint and Tween software which runs on DEC PDP-11 and Vax computers. Paint is used to create images, while Tween performs the task of an animator's assistant, interpolating the positions of an image between *key frames*. Another program, Tweep, colors each frame.

Other aspects of the Images system allow the artist or animator to add airbrush-style shading, produce mechanical drawings using software drafting tools and manipulate the hues and shades of the 16 million-color palette. It will also allow images from real life to be scanned with a color video camera, then integrated into the digital scene, or even "mapped" onto surfaces. (A similar mapping technique can be seen in a current rock video clip produced by NYIT, "Adventures in Success with Will Powers." In it, a trio of singing masks rotates on the screen, a female face mapped on the inside, as well as outside, of each one.)

To date, Computer Graphics Lab has sold four systems in various configurations. Among the customers are a Japanese film company using theirs to produce a feature film version of the "Lensman" science fiction novels by "Doc" Smith. Nolan Bushnell's Pizza Time Theater company will use its 2-D system to produce "Saturday morning" style cartoons based on the characters originated at the eatery chain.

Film amd Video

The film and video shows at Siggraph are legendary events which highlight the best electronically produced film and video of the year. With enough audio, video, and laser equipment to rival a major rock show, the multi-screen show is an attraction all by itself. Large crowds of 3000 to 5000 assembled in Cobo Arena for two different presentations which were preceded by laser shows from the Wisconsin-based Laser Fantasy group.

The Siggraph film audiences are unique. The crowd doesn't just ooh and ahh, but recognizes specific techniques used in the computer pictures. It is not unusual, then, to hear comments like "great ray-tracing," or "good fractals," both of which refer to the mathematics used in producing the images. And when the fans see something outstanding, they stomp and cheer wildly. Siggraph, in fact, is probably the only place where audiences applaud individual *shots* in films.

Most of the films and video reels are assemblages of visual experiments and demonstrations of specific techniques, without plot or story. Many are abstract or boldly geometric exercises. There is so much of this beauty for beauty's sake that NYIT's Lance Williams has nicknamed it Doily-vision.

There were so many films shown in two nights that it would be impossible to review or summarize each one in this space. A few important ones do deserve special mention, though.

"ACT III" was produced by New York artists Dean Winkler and John Sandborn using a Via Video painting system and several digital video effects systems (the kind used to produce television commercials). A whirling, six minute-long kaleidoscope of shapes, it seemed a perfect visualization of the Philip Glass music it was set against. This was probably the best unified video piece in that it reached beyond experimentation and simple exercise.

Several demonstration reels were extremely well received. Cranston/Csuri Productions, a commercial offshoot of the computer graphics project at Ohio State University, displayed an exceptional reel which included very impressive examples of shaded and transparent geometric objects. The reel from a relatively young computer images company, Pacific Data Images of Sunnyvale, CA, showed a keen sense of art direction in a specially-created Siggraph logo and in a short segment titled "Teddy Bear Maelstrom." In the latter, digital bears looking as though they were constructed from balloons cavorted on a circular track in space to a synthesized version of the "Teddy Bear's Picnic."

If there was a dream system on display at the Siggraph exhibition, it was Images, offered by Computer Graphics Lab, Inc.

Other commercial demo reels included work from Robert Abel & Associates, a pioneering company best known for its Levis and Seven-Up ads, Bo Gehring Associates, which included a scene from the feature *Nightmares* (video games gone

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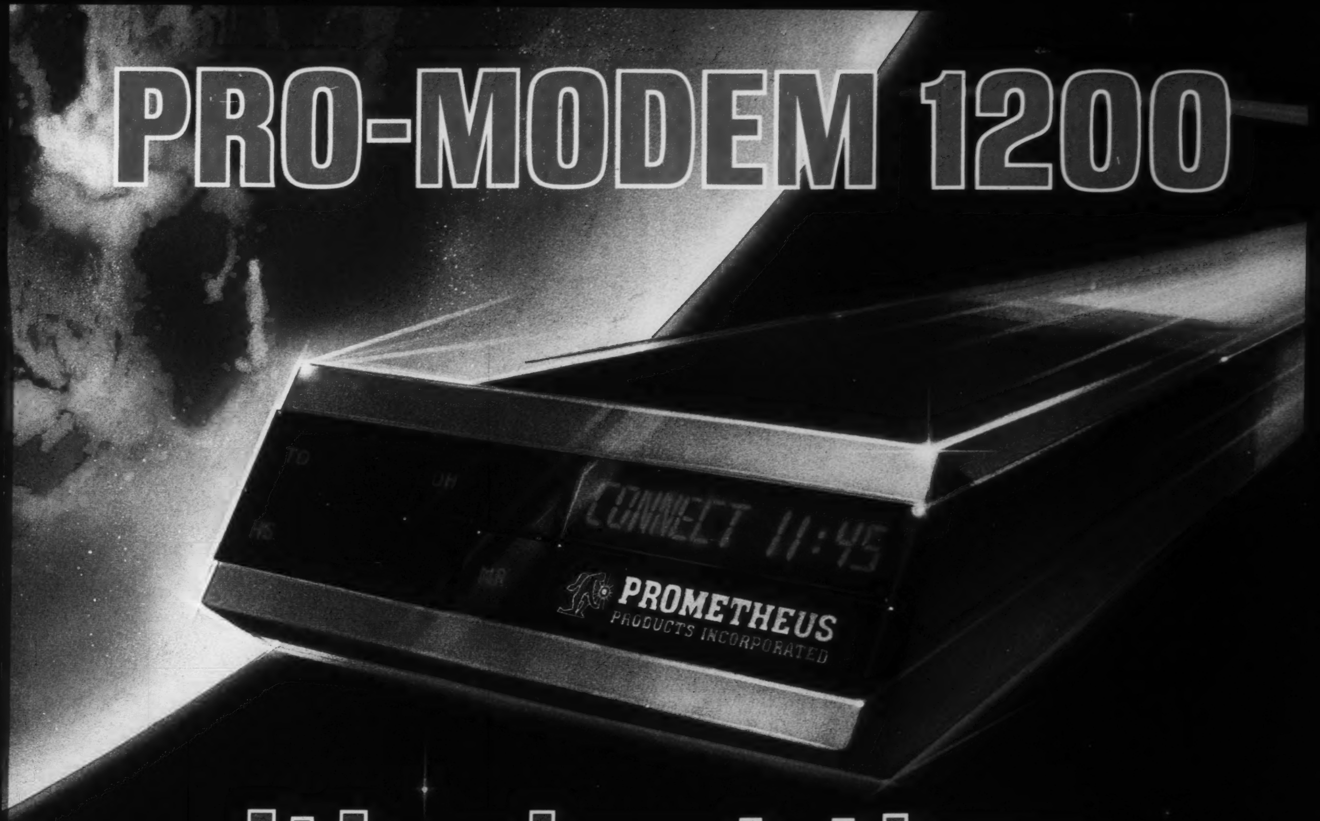

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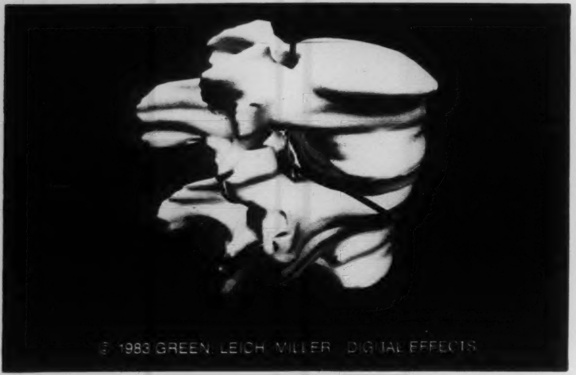

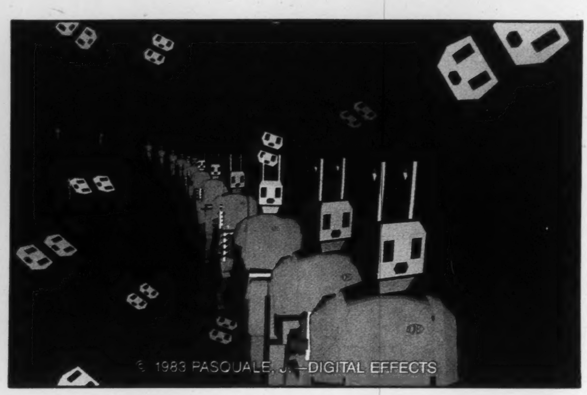

berzerk) and Digital Effects, Inc. Produced by Judson Rosebush, who was responsible for the character of the Bit in Disney's *Tron*, the Digital Effects reel offered, by far, the sharpest, cleanest imagery in the shows.

Z-Grass

Not every film was produced using million-dollar computer hardware. One, "OUA OUA" (from an old Hawaiian tune), used the simple effect of a mirror image singing face to a humorous effect. Several examples of Z-Grass animation were shown, including "Floater" by Jane Veeder, "Only Eyes" by Margret Rawlings and "Nuke the Duke" by Charles Kesler and Jaap Postma.

Z-Grass is a graphics computer language developed by Tom DeFanti, one of the founders of Siggraph, and uses relatively inexpensive hardware based on a Z 80 microprocessor. Low-cost hardware is also used by Movie Maker software, a demonstration of which was also shown. The program, developed by Guy Nouri and Eric Podietz of Interactive Picture Systems, New York, currently runs on the Atari personal computers and is being prepared for the Apple II, IBM PC, and Commodore 64 as well. Its results show that it is a perfect introductory tool for artists and animators interested in beginning to learn about computer pictures.

The masterwork of the show was "Growth: Mysterious Galaxy" created by Yoichiro Kawaguchi.

Atari and Lucasfilm submitted examples for the film shows. In 1982, Lucasfilm showed their "Genesis Effect" clip from *Star Trek: The Wrath of Kahn*, a true achievement in computer effects. This year's clip was less impressive, the computer map effects from one scene of *Return of the Jedi*. Atari's offering was almost embarrassing. It was a clip from *Superman III* featuring comparatively crude video game-like animation. There seemed to be some question as to why it was even shown with other works of much higher quality.

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Japanese Entries

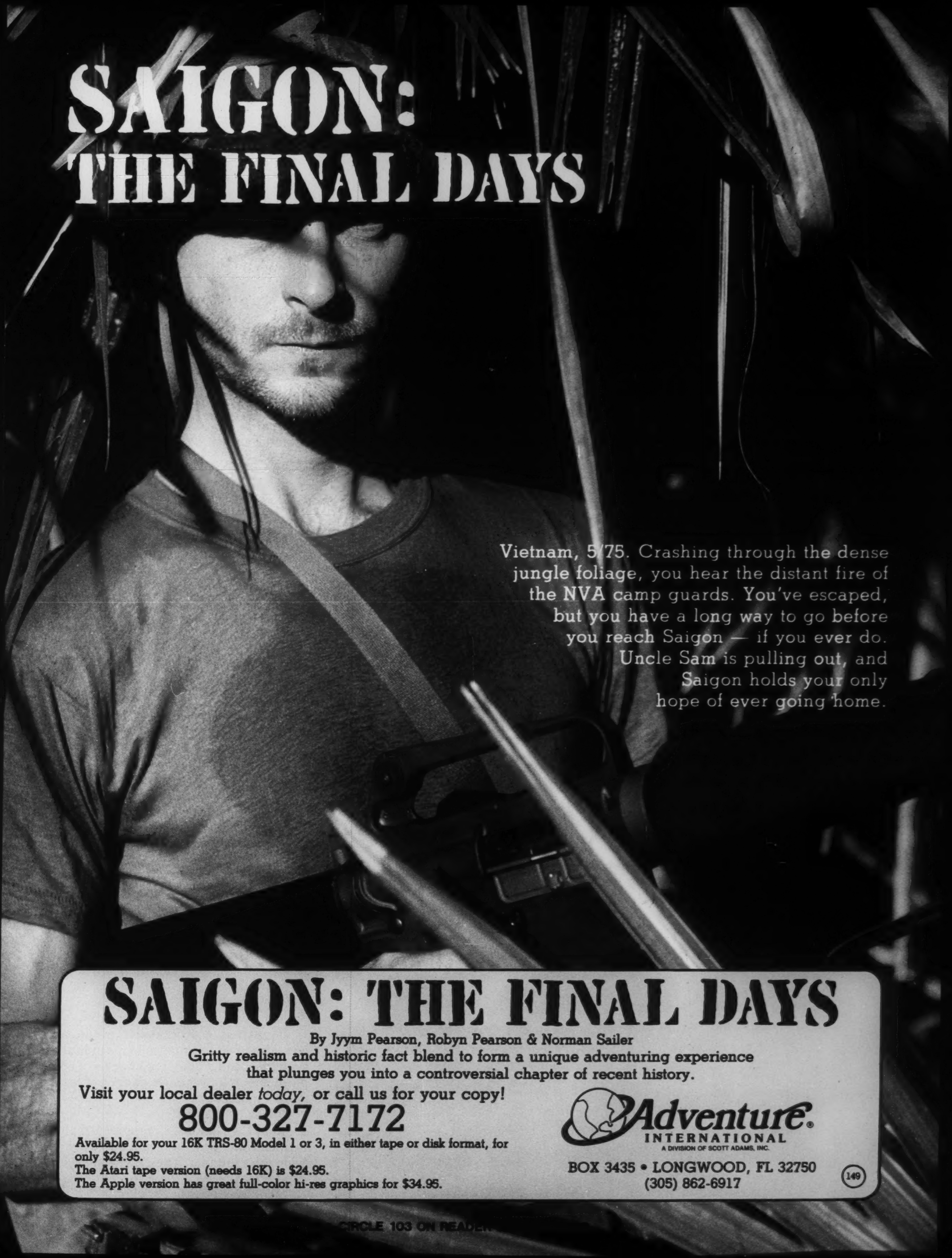
Special mention must be made of three Japanese works shown at this year's SIGGRAPH. "Origami," produced by NHK (the national television network) Special Programs Division, was a lyrical film about the art of paper folding, its geometry perfectly suited to computer techniques. "Mandala 1983" was produced and directed by Toyohiko Higashi and Masaki Fujihata for the Deibu Promotional Network. It was another strongly geometric work whose best image was a tray of multi-colored crystal balls generated on a Cray-1 supercomputer.

Finally, the masterwork of the show was "Growth: Mysterious Galaxy" created by Yoichiro Kawaguchi. Kawaguchi's growth algorithms (descriptive mathematical formulae) perfectly blend aesthetic design and sophisticated computer science to produce a distinct organic effect. Kawaguchi is one of the pioneers these techniques and is apparently their undisputed master.

Show Stopper

Again, the strong showing of the New York Institute of Technology must be noted. Its deomonstration reel, an accumulation of experimental and commercial work from the previous year, was, as always, a show stopper, elicting howls of glee and noisy appreciation. Virtually each scene in the 11-minute reel was greeted with enthusiastic response.

Included in the reel were new openings for CBS television sporting events and Home Box Office commercial logos, the rock video mentioned earlier, and an except from Twyla Tharp's video dance piece, "The Catherine Wheel." Also seen were segments from three NYIT in-house



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productions: "The Mouse's Ear," a surrealistic cartoon being developed by Duane Palkya and "3-DV," an extremely funny clip from a proposed television special featuring a silly all-robot cast.

> **A competing conference sponsored by the National Computer Graphics Association may be stealing some of Siggraph's thunder.**

Last, but certainly not least, a few more minutes from NYIT's long-running feature project, "The Works." Its main characters, again, are robots, the most famous of which is a giant machine which looks and works like an ant. New this year was the addition of a one-legged hopping robot welder.

The first few minutes of "The Works" debuted at Siggraph several years ago, and only a few more have been added over the years. This lends some doubt that the film will ever be finished, acknowledged by the in-joke t-shirts prematurely advertising a sequel, "The Works II." Lance Williams cites the difficulty in producing a few new minutes of the films, since they must be sandwiched in with continuing research and commercial projects. And, he says, there is no money for real production to proceed with "The Works" or "'3-DV." Still it is almost impossible to believe that these fantastic works can go any longer without funding. They seem to be solidly commercial ideas.

It is clear that NYIT is virtually (and single-handedly) defining the genre of computer animation. We can only hope that advances in technology and software development will bring the group the kind of economic rewards and public appreciation it deserves.

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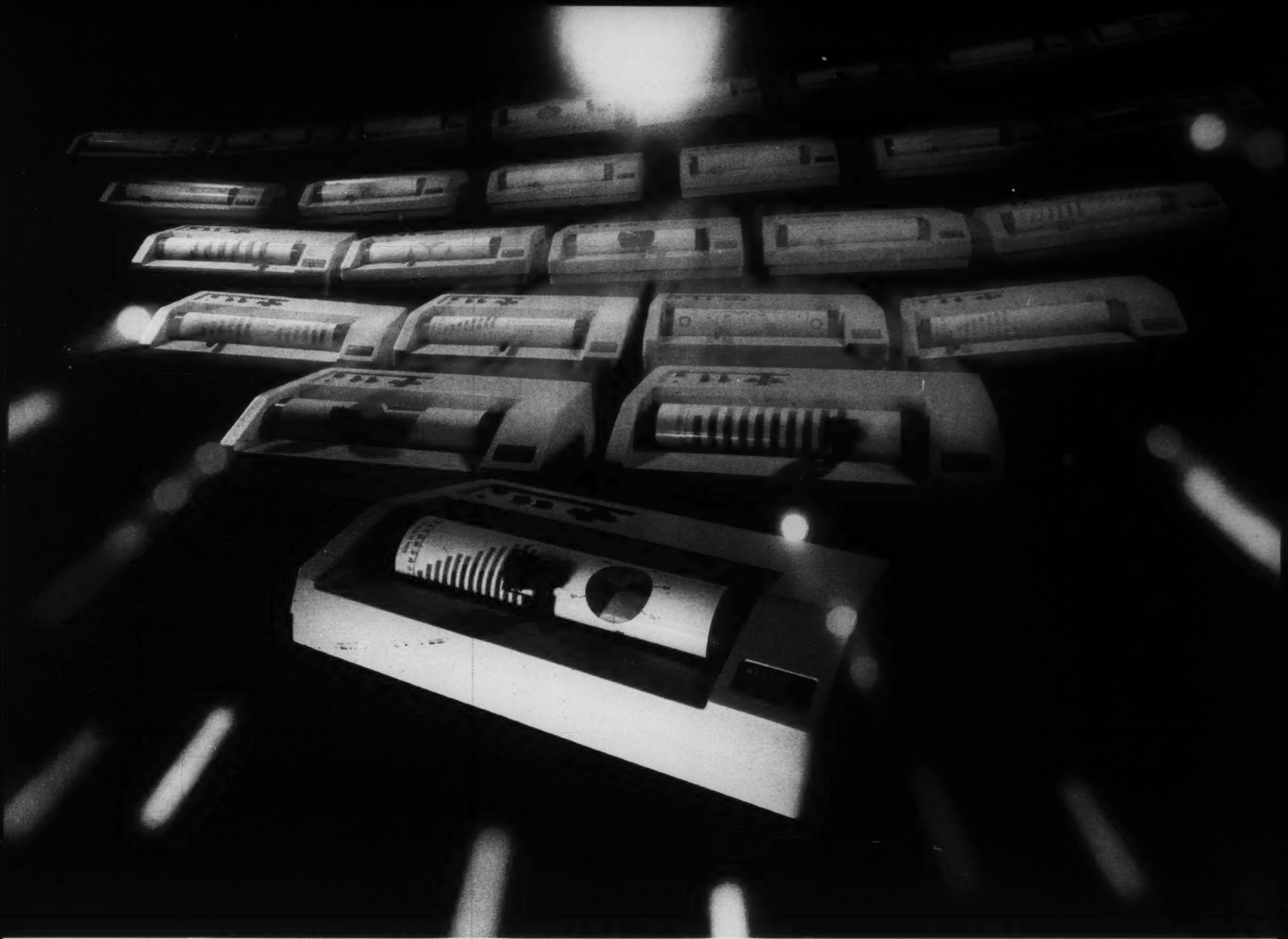
One historical note: NYIT dedicated its 1983 Detroit Siggraph reel, appropriately and with a note of cynicism, to the United Auto Workers.

Pricing Itself Out Of The Market?

Siggraph is a spectacular event, and one of genuine importance to the industrial, academic, and commercial worlds of computing. Is it, however, in danger of losing its preeminence?

Already, a competing conference sponsored by the National Computer Graphics Association may be stealing some of Siggraph's thunder. The NCGA show and



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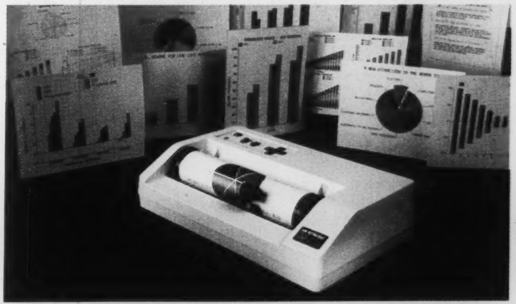

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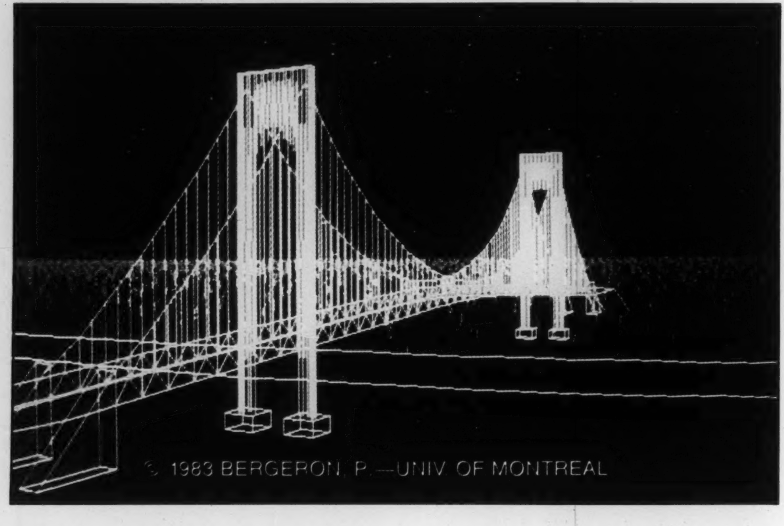
conference, held in Chicago a month before Siggraph, reportedly drew over 24,000 people.

One sorry suggestion is that Siggraph may be too expensive for many to attend. The cost of attending courses ranges from $125 for students, to $410 for late registrants who are not members of the ACM. Technical sessions cost from $35 to $290. Siggraph-furnished lunches sell for an outlandish $20, and course notes and copies of the papers delivered seem overpriced at $280 for a complete set of notes and papers.

Too, the Japanese have shown remarkable advances in computer graphics and a commitment to develop both new hardware and programming techniques. This year, the Japanese will hold their own version of Siggraph, sponsored by their own recently-formed organization, Nicograph (Nippon Computer Graphics). Nicograph and Nihon Keizai Shimbun (Nikkei, Japan's business newspaper and publishing company) has hosted parties at the last two Siggraph conferences, attracting the cream of the American graphic talent. Nikkei is also behind a Computer Graphics Grand Prix competition, which offers, not just the honor of having works shown, as Siggraph does, but significant cash prizes for the best computer-generated film and video.



A lesson might also be learned from the support that Nicograph has gathered in its own country. The importance of computer graphics to Japanese industry is evident from the list of Nicograph's counselors, which includes the presidents of Nissan Motor Co. (Datsun), Fuji Film, Victor Company of Japan (JVC), Casio Computer, Sord Computer, IBM Japan, Nippon Steel, Ricoh, and the mammoth Matsushita Electric (Panasonic).

Also associated with the group are Kasuhiro Fuchi, the director of ICOT Research Center (the Institute for New Generation Computer Technology); Isao Tomita, the famous electronic composer; Sakyo Komatsu, Japan's best-known science fiction author; and Dr. Shigeru Watanabe, president of the national Japan Microcomputer Club. With this support, it is clear that the Japanese intend to establish a leadership position in the graphics field.

It is to be hoped that, in light of the competition both at home and abroad, that Siggraph can maintain its claim as the world's premier computer graphics event. To do so, however, may take some work and even newer ideas. ☐

Siggraph '84 will be held in Minneapolis, MN, July 23 to 27, 1984. For information, contact Siggraph Conference Office, 111 East Wacker Dr., Chicago, IL 60601, or telephone (312) 644-6610.

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The Home Computer Industry And Wall Street

Ken Uston

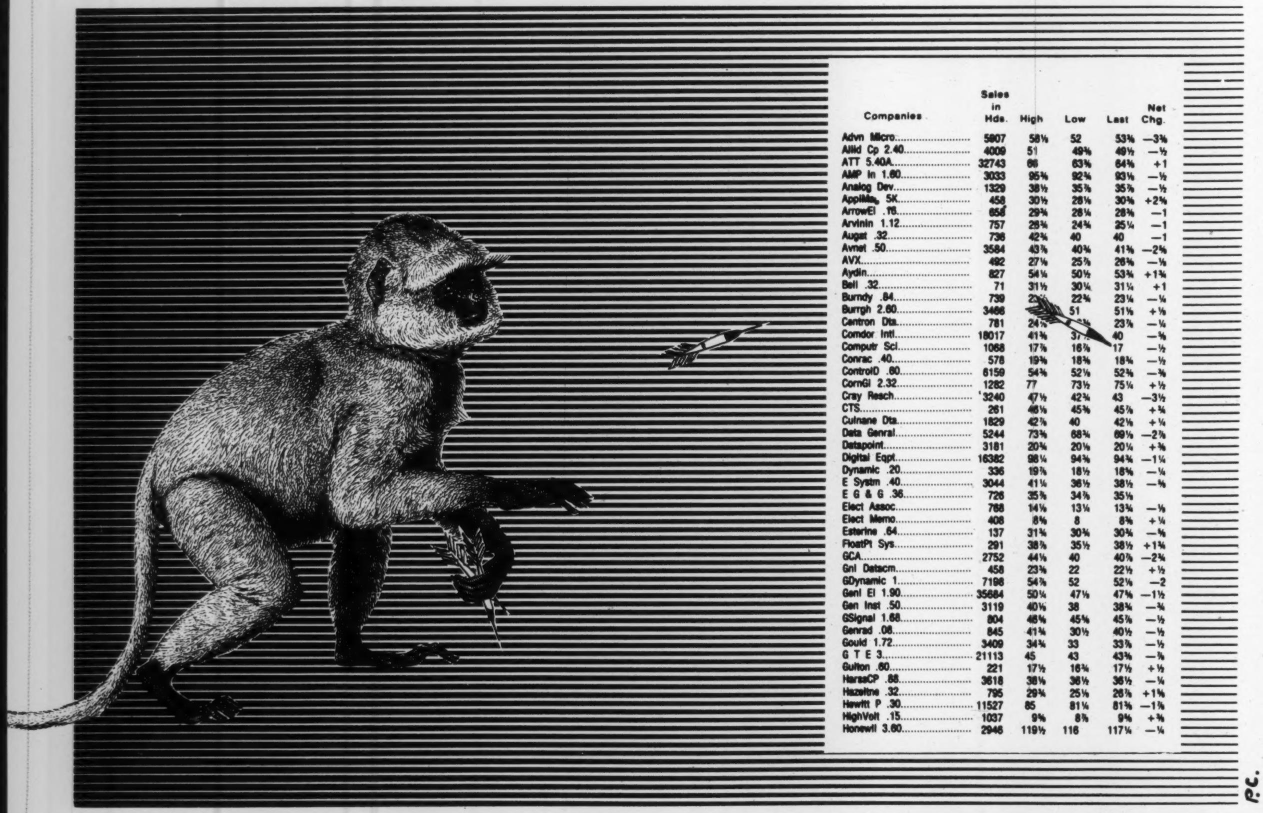
I used to be Senior Vice President of the Pacific Stock Exchange. In that capacity, I ran into many brokerage types, both "customer men" (a fancy name for stock salesmen) and research analysts. Those encounters eventually convinced me that Wall Street (Montgomery Street in San Francisco) often foists all kinds of spurious "advice" (snake oil?) on an unsuspecting public.

I recall a conversation with the chairman of the exchange, who was a floor specialist, in which he confided to me, "I'd never invest in the market for my own account. Sure, I sit on the floor every day, watch the tapes go by, and I'm far more up-to-date than any individual investor could possibly be. Yet there is no way I would buy and sell stock on my own. On stocks that I specialize in, I make a ding (commission) on every trade. If it weren't for the dings, I'd probably lose money."

A monkey tossing darts at a listing of stocks on a wall will do as well as most Wall Street investment counselors.

This remark brings to mind Andy Tobias's best-selling, iconoclastic books (*The Only Investment Guide You'll Ever Need* and *Getting By On $100,000 A Year*). Tobias states that a monkey tossing darts at a listing of stocks on a wall will do as well as most Wall Street investment counselors.

I have nothing against Wall Street, but



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Allid Cp 2.40	4009	51	49⅜	49½	−½
ATT 5.40A	32743	66	63⅜	64⅜	+1
AMP In 1.60	3033	95¾	92¾	93⅛	−½
Analog Dev	1329	38½	35⅞	35⅞	−½
ApplMa 5K	458	30½	28⅛	30⅜	+2⅜
ArrowEl .16	658	29¾	28¼	28⅜	−1
Arvinin 1.12	757	28¾	24¾	25¼	−1
Augat .32	736	42¾	40	40	−1
Avnet .50	3584	43⅞	40¾	41⅜	−2⅝
AVX	492	27⅛	25⅞	26⅜	−⅛
Aydin	827	54¼	50½	53¾	+1¾
Bell .32	71	31½	30¼	31¼	+1
Burndy .84	739	[illegible]	22¾	23¼	−¼
Burrgh 2.60	3466	[illegible]	51	51⅛	+⅛
Centron Dta	781	24⅞	[illegible]	23⅞	−¼
Comdor Intl	18017	41⅜	37½	40	−⅜
Computr Sci	1068	17⅞	16⅞	17	−½
Conrac .40	578	19¾	18¾	18¾	−½
ControlD .60	6159	54⅜	52⅛	52⅜	−⅜
CornGl 2.32	1282	77	73½	75¼	+½
Cray Resch	'3240	47½	42¾	43	−3½
CTS	261	46⅛	45⅜	45⅞	+¾
Culnane Dta	1829	42⅞	40	42⅛	+¼
Data Genral	5244	73⅜	68¾	69⅛	−2⅞
Datapoint	3181	20¾	20⅛	20¼	+⅜
Digital Eqpt	16382	98¼	94⅜	94¾	−1¼
Dynamic .20	336	19⅞	18½	18⅜	−¼
E Systm .40	3044	41⅛	36½	38½	−⅝
E G & G .36	726	35⅞	34⅞	35⅛	
Elect Assoc	768	14⅛	13⅛	13¾	−⅛
Elect Memo	408	8⅜	8	8⅜	+¼
Esterline .64	137	31¾	30¾	30¾	−⅝
FloatPt Sys	291	38⅞	35½	38½	+1¾
GCA	2752	44⅛	40	40⅞	−2¾
Gnl Datacm	458	23¾	22	22½	+½
GDynamic 1	7198	54⅞	52	52⅛	−2
Genl El 1.90	35684	50¼	47⅛	47⅜	−1½
Gen Inst .50	3119	40⅛	38	38¾	−¾
GSignal 1.68	804	46⅝	45⅝	45⅞	−½
Genrad .08	845	41¾	30½	40½	−½
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when it comes right down to it, the stock market is not even what the statisticians call a "zero sum game" in which the total won by some people is lost by others. This is because we must subtract brokerage commissions, which, even with the discount brokers, are substantial. My point? Since I began studying the home computer industry, I have seen more and more evidence that Tobias's monkey theory is probably accurate.

The December 8 Debacle

Let's take Atari as an example. On December 8, 1982, Wall Streeters were stunned when Atari announced a huge loss—so stunned that, to this day, we hear about the "December 8 Debacle." The investment community was taken totally by surprise, and Warner stock plummeted. (The Securities and Exchange Commission, incidentally, is investigating several top Warner officials who allegedly unloaded gobs of Warner stock just before the announcement.)

For many months prior to this, the video game magazines were writing about the horrible VCS *Pac-Man* cartridge. Arnie Katz, the editor of *Electronic Games Magazine*, told me at the June 1982 CES that he had been told there were millions of dollars of *Pac-Man* cancellations.

The fact that Atari's *ET* game was unacceptable was no secret to thousands of gamers; yet Atari had hoped this cartridge would become a mega-hit because of the popularity of the movie. And, of course, it was quite obvious to anyone attending June 1982 CES that everybody and his brother was jumping into the VCS software business; there were over 30 producers at that point. Sure, you might say, "That's hindsight." But let's continue the story.

At the Billboard Video Game Conference in San Francisco in April, oft-quoted Lee Isgur of Paine Webber gave a speech. He predicted that Atari could well be "the Coleco of 1983" and that the company could rise "from its own ashes." Another Wall Streeter, Michele Preston from L. F. Rothschild et al., spoke at the conference. She thought that the worst was over for Atari.

Now, the supreme irony. On that very day, guess what was happening 3000 miles to the east? You guessed it! Atari released first quarter results: a $45 million loss for the consumer electronics division.

A few months went by and Wall Street again settled down. But another bomb went off on July 22 when Warner reported losses for the second quarter of $283 million. The Atari subsidiary lost $310 million—coincidentally the exact same amount (to the nearest million) that Chrysler posted as its earnings for the second quarter—and on the very same day! (Remember the olden days when auto companies were in trouble and Silicon Valley companies were considered the panacea for the U.S. economy?)

Had Wall Street learned its lesson and expected the worst? You be the judge, from the following reactions:

- Crowell, Weedon & Co.: "It's mind boggling. I never expected anything on that order of magnitude."
- Wertheim & Co.: "It's frightening."
- Goldman, Sachs & Co.: The large loss was "totally unpredictable."

> ***I have seen more and more evidence that Tobias's monkey theory is probably accurate.***

Even Atari management was baffled. Steve Ross, Chairman of Warner, stated, "A loss of this magnitude clearly was not anticipated."

Trouble In Texas

Let's take another example. People who play video games and use computers have felt that the TI 99/4A has been overpriced since its inception. Even free evaluation models gathered dust in some magazine offices; some TI 99/4As were never taken out of their boxes. The programming language (TI Basic) is one of the poorest in the industry. The games are even drabber.

Yet the Bill Cosby ads have been selling the 99/4A at rates that stun knowledgeable computerists. At the June CES, TI placed ads touting the 99/4A with, not one, but four faces of Bill Cosby. I guess this proves the old marketing adage, "It's the sizzle, not the steak."

The industry was once again taken by surprise when, after an announcement that TI expected to lose about $100 million in its second quarter, TI stock dropped almost 50 points in two days. Reeling from the shock, industry analysts swung their pendulums the other way. One Wall Streeter called for TI to get out of the home computer business. A major newspaper ran a front page article predicting doom and gloom for the entire industry.

Not The Age Of Aquarius

Mattel is an interesting case, too. They displayed Intellivision 3 (in a secret back room) at the January, 1983 CES. While the system is fabulous, Mattel was shown to be out of phase with the industry. Intellivision 3 was made obsolete just one month later by the Coleco wafer tape cartridge.

Mattel's Aquarius also appeared in January. Most reviewers have panned this system. A Mattel marketing executive showed us the in-house slides of the economic and marketing rationale behind the Aquarius system (at the Billboard conference). Someone asked him pointedly, "Does the public really want to balance their checkbook, keep a budget, or try to write with a rubberized keyboard, or is the Aquarius essentially a solution in search of a problem?"

What happened a few months later? Mattel reported electronics division losses of $34 million. The heads of several key Mattel executives rolled just a few weeks later. Losses continued to mount, and in August, 400 employees of Mattel's electronic division were laid off.

Advice And Predictions

My advice to Wall Streeters: It is well and good that you read industry reports,

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visit companies, and talk to management. But you should also try to get your information straight from the horse's mouth. When you get home from work, take off your three-piece suits, put on a pair of jeans, grab a joystick, and play some games. Then and only then will you really find out what is going on in the industry.

Enough criticism. Now I shall go out on a limb with some long range predictions.

The home computer hardware industry is similar to the auto industry 60 years ago when there were dozens of car manufacturers trying to cash in on the enormous potential (does that phrase sound familiar?) of the horseless carriage industry. Today, of course, there are only a handful of U.S. car producers. Eventually, there will be only a few dominant hardware manufacturers. The most likely to succeed are:

- IBM. They will make it on quality and name. Watch for a mid-range ($500-$700) home computer of excellent quality before long.
- Apple. Support (software and peripherals) is hard to beat. I don't know about Lisa, but I have a feeling other new products (perhaps the MacIntosh) will make a real dent in the market.
- Coleco. The Adam may be a smash. Lots depends on where Coleco sells it

Paul Erdman, The Economy And Silicon Valley

I recently heard a talk by Paul E. Erdman at a writers' conference in San Francisco. Erdman is the fellow who, while working for the United California Bank in Basel, Switzerland, was caught with his hands in the cookie jar and served time in a Swiss jail, convicted in a banking scandal.

While in jail, he launched a writing career. His *The Crash Of '79* became a best-seller and was acclaimed for its prophetic accuracy and for the way it made complex international monetary matters simple and understandable. Erdman has been labeled "America's most audacious oracle" with "a crystal ball of his own."

Among Erdman's uncannily predictive books are:

- *The Billion Dollar Sure Thing*, a novel which deals with gold and the dollar. In the book, gold goes way up, and the dollar goes way down (it was written before gold soared to around $800 per ounce several years ago).
- *The Silver Bears*, a story about several speculators who try to corner the silver market. The attempt ends in disaster. *The Silver Bears* was also prophetic; it was written before the Hunt Brothers silver debacle.

While Erdman's talk focused on the U.S. economy in general, he had some interesting insights into the computer industry.

Erdman recently completed his first non-fiction work in which he predicts how the U.S. economy might evolve over the next two to five years. He presents both pessimistic and optimistic scenarios:

Pessimistic: The Third World debt (they owe about $700 billion to the International Monetary Fund) and immense U.S. budget deficits will force interest rates back up to the 20% level of 1980. By 1984-5, we will be in the same mess we were in 1980.

Photo copyright Jerry Bauer.

Paul Erdman.

Optimistic: GNP will continue to increase by 6% annually (as it is now), swelling U.S. tax receipts and decreasing the deficit. Demand for product will increase, and the economically imperiled Third World nations (such as Brazil, Mexico, and Costa Rica) will pull out of their current crises. (An aside: Mexico is solving part of their problem by exporting unemployment. Guess to whom?) We will see a dramatic economic recovery and return to the prosperity of the Eisenhower 50's.

Erdman predicts that the U.S. will win the race with Japan to develop the 256K chip.

Erdman doesn't think that either of these scenarios will actually occur. The future, he feels, lies somewhere in between. He predicts that interest rates will rise a little bit (they have, in fact, been rising slowly since May) and stabilize, certainly at least until the 1984 election. His investment advice: stay with "financial assets" (e.g., stocks and bonds) a year and a half or so. Then watch carefully and be prepared to shift into hard assets (e.g., gold and silver).

Erdman also noted "Problems In Paradise" as he called the trouble in Silicon Valley. He sees two problem companies: Atari and Texas Instruments (the speech was made after the TI loss was announced, but before the $300 million Atari deficit).

"But," he adds, "that ain't high tech; that's low tech. A lot of 18-year-olds could build Ataris in their garages."

Erdman assesses TI as a component company that got greedy and went into equipment. "Silicon Valley (the computer industry in general) is by no means dead," Erdman states, "and could be as alive now as it was when it started 20 years ago. I hope so, because its growth is critical to the U.S. economy."

Erdman predicts that the U.S. will win the race with Japan to develop the 256K chip despite many ominous forecasts to the contrary. This is due, he feels, to two factors:

- Much innovation and creativity is occurring in homes, attics, and garages around the country "as Steve Jobs did with the Apple. You can't do this in Germany—you'll get arrested for espionage—or in Japan."
- The availability of venture capital gives the U.S. a significant advantage. Germany and Japan are dominated by universal banks; they have no concept of venture capital.

Erdman believes that Silicon Valley will constitute the country's key growth industry during the 1980's. "In 1990," he goes on, "*the* industry will be genetic engineering; companies such as Genentec will blossom in about 10 years."

Erdman predicts the U.S. will also prevail against Japan in this race and assume a leadership role. *—KU*

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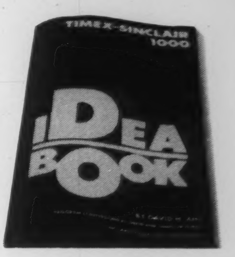

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Wall Street, continued...

(better in computer stores to compete with more expensive systems, than in toy stores, competing with far cheaper game machine/home computers).

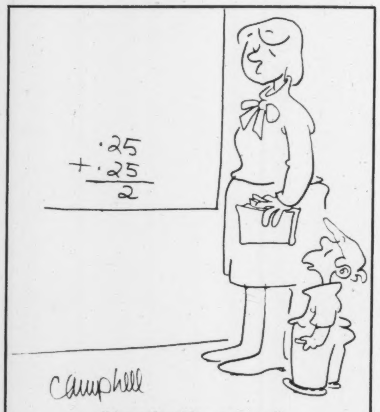
• Commodore. It is hard to argue with success. Commodore passed out their third quarter figures at CES, showing income and earnings per share more than double 1982 levels. But I am still skeptical. The Vic 20 sold tons, and lots of companies are making software for it. The 64 is doing well, too. But neither of these computers in my view can currently be said to excel in the three major areas in which home computers are used: games, education and word processing.

With the enormous volume of software coming out from Commodore and others, this could change. But, as I said, I am skeptical.

• Atari. They are losing multi-millions now, but they have taken some good corrective steps: merging the computer and video system divisions, laying off thousands of workers, moving manufacturing to the Orient, writing off apparently all of their dead game inventory, and introducing their excellent XL and DXL computer line (and making it compatible with previous Atari computers).

Atari does make the best game computers on the market, and the game software available for Atari computers is, in my opinion, the best in the industry. Atari will continue to be a dominant factor in the market. I don't know what this means to their bottom line, however.

If you think the hardware industry is confusing and dynamic, consider the software industry, which is a real can of worms. I can't begin to predict specifically what will happen there, but I will caution, while this isn't any great revelation, to watch for a shake-out. The shake-out, however, will be so enormous that Wall Street will again be stunned, and you will see first page headlines about it in virtually every newspaper in the country. ☐



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Personal ROBOTS

Gordon McComb

It sat, motionless, in the corner of the room. At first, the passers-by mistook it for a wet/dry shop vac. "Must be one of those new-fangled Japanese jobs," I heard an obnoxious salesman say. "You know, the kind you can use to pick up anything."

Moments later, the "vacuum cleaner" mysteriously began to move on its own, and bumped into desks, chairs, and people on its way. It careened around guests and furniture with a tipsy drunkenness, then stopped, remained still for a moment, and continued on with its adventure. Whatever it was, it was eerily feeling its way around the room, studying its surroundings. It was definitely cleaning the carpet.

An uneasy silence fell over the small crowd. The only sound that filled the air was the high-pitch whine of motor-driven wheels. Soon all, including the

Gordon McComb, 3134 Lincoln St., Suite E, Carlsbad, CA 92008.

Nolan Bushnell with friends, Topo and B.O.B.

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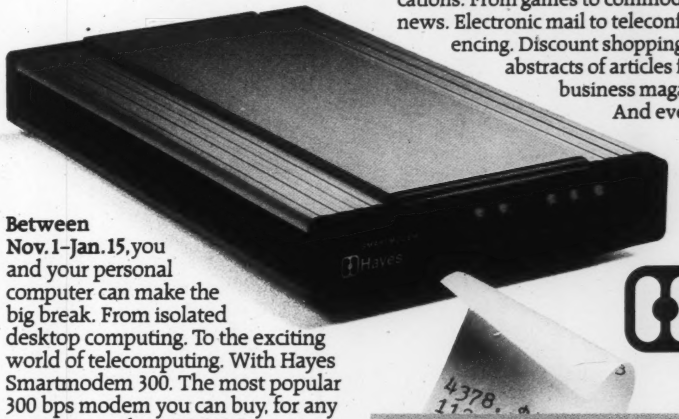

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dim-witted salesman, began to realize that the two-foot tall metal and plastic canister was no ordinary household gadget, nothing as mundane as a machine to suck up dust balls.

It was a robot.

Indeed, the "shop vac" cum automaton described above—the RB5X from Golden, Colorado-based RB Robots—is just one of the first in what soon will become a long line of "personal robots": clanking and whirring mechanical contraptions that we will use to help us wash the car, change the cat's litter box, watch over the baby, protect the house.

Fantasy has an unnerving way of creeping into reality.

Science fiction stuff? So were the visions of a computer in every home, particle beam "space weapons," atomic fusion, and pocket TVs. Fantasy has an unnerving way of creeping into reality.

Today, personal robotics is where personal computers were in the early-to-mid 70's. The computing industry took nearly ten years to blossom into what it is now. Consumer robotics has just started—it officially began only a year ago. Some believe that it, and not computers, will be this decade's fastest growing industry.

Many companies, mainly Heath, Androbot, and RB Robots, have already started their campaigns to bring automation into the home. What is available today, and is it more than a curio? More importantly, where is robotics heading? Why isn't robotics more advanced? The industry seems behind the times. And what might appear in the few short years?

Let's take a closer look at robots: their past, their present, and their future, and find out if the aluminum and molded plastic bucket of bolts we call "robot" is really here to stay.

Turning Back The Clock

Before anything can be said about present-day robots and their eventual use in our society, we must turn back the clock and take a short peek at the history of the robot.

It is believed that the roots of robots can be traced as far back as Greek mythology to Talos, a giant man-like bronze automaton who guarded the island of Crete. The further use of functionoids in literature, however, seemed not to proliferate until the early 1800's. An example from that time is "The Sandman," a tale about a beautiful dancing robot by German writer E.T.A. Hoffman.

Other writers, including Edgar Allen Poe, Nathaniel Hawthorne, and Jules Verne, soon picked up on the idea of machines doing the work of humans. Perhaps the dawn of the industrial age and the advent of steam-driven locomotion, had something to do with the true birth of mechanical man.

In 1921, Karel Capek, Czech playwright and novelist, coined the term "robot" in his play "R.U.R." ("Rossum's Universal Robots"). The term robot is based on the Czech *robota*, meaning *compulsory labor*; and *robotnik*, meaning *workman*. Capek's robots, played by actors in silvery suits and shoes, rebelled against their masters, thus setting a precedent that has continued to this day: robots as a symbol of evil.

Robots continued to serve as a hint of the dark side of man in science fiction works for nearly two more decades. In 1940, however, writer Isaac Asimov broke the spell when he wrote a story called "Strange Playfellow," about Robbie, a robot that couldn't help but be loving and faithful and kind.

To make robots more palatable to an audience used to mechanical antagonists, Asimov later defined three rules all robots in his stories obey (some other authors have adopted these rules into their writing, too). The first, and most important rule: "A robot may not harm a human being, or, through inaction, allow a human being to come to harm."

Although Asimov believes that this rule is applicable to real-life robots as well, his golden vision is without basis: already government-owned robots are being used as sentries, providing their masters "shoot to kill" capabilities.

Fiction, more than anything else, has played an important role in the acceptance or non-acceptance of the robot. On one hand we see Asimov's Robbie and R2-D2™ and C-3PO™ of *Star Wars*. On the other, we have such hedonists as Kronos (who appeared in a terrible 1957 movie by the same name), Gort (from the classic "The Day the Earth Stood Still"), and Maximilian (the devilish robot from Disney's "The Black Hole").

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Androbot, a new company financed by ex-Atari mogul Nolan Bushnell, has striven to develop "friendly" robots. Handless and footless, the Androbot family rolls around on two motor-driven wheels that are canted at 45-degree angles. Their cute bodies and soulful "eyes" (actually various types of sensors) were designed to make them seem less intimidating.

Androbot spends a great deal of time trying to convince people that robots are kind and gentle. For example, one press release for Topo, the less intelligent of the two Androbots, has a line that reads: "From the very look and shape of the head and body style, Topo tells you that he's going to be a cheerful, loyal friend."

Handless and footless, the Androbot family rolls around on two motor-driven wheels that are canted at 45-degree angles.

To add credence to their claims of gentleness, Androbot built Topo and B.O.B. with stress-sensing capability. If Topo or B.O.B. encounters an obstacle, the stress circuit detects the overload on the motor and shuts the robot down. The plastic hand or "claw" on Heath's robot, Hero 1, has a similar safety mechanism. A ratchet-like device on the hand keeps the pincher from exerting too much force.

There is one other reason that robots seem frightening to people, and no amount of cuteness can correct it. Since the introduction of the robot into industry in the 1950's, skilled and unskilled laborers alike have feared that they will be replaced by robots.

People had a similar feeling when computers began taking over mundane office tasks. But the general attitude today is that, if anything, computers have created jobs, and higher paying ones at that. The bottom line: Robots, like computers, must earn their keep—and the respect of humans working with them.

Already, it seems, robots are doing just that. The few computer dealers across the country who handle robots report that there is intense public interest

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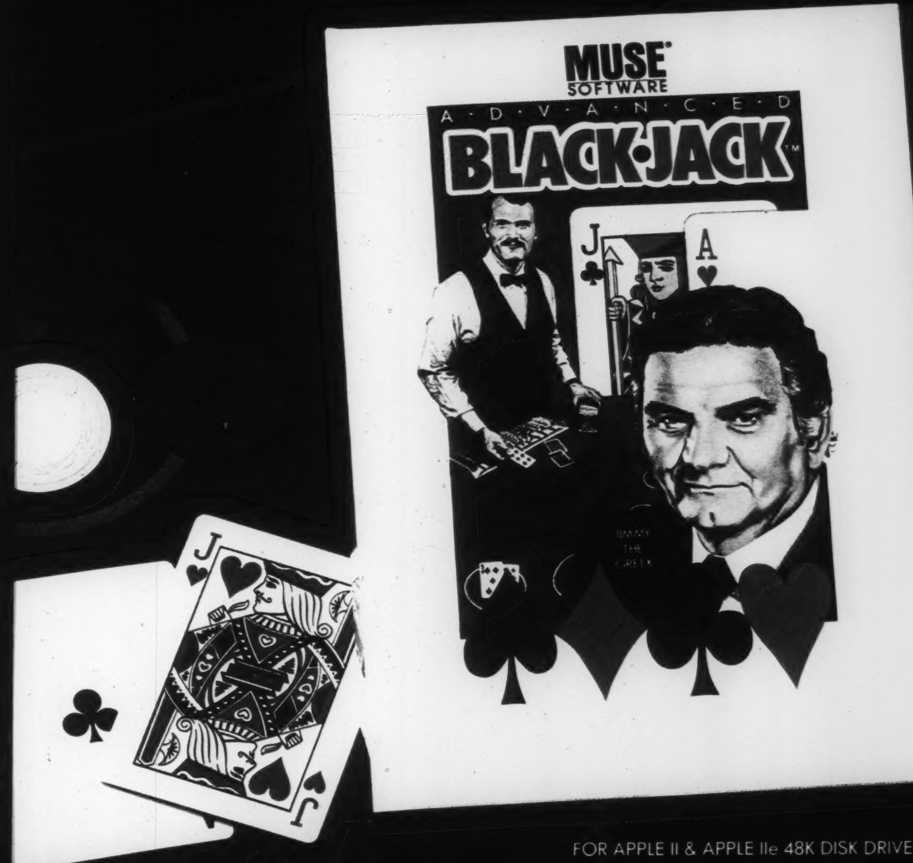

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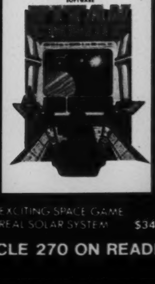

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in them, and that often demand is much greater than supply.

Topo

Industrial robots do so many weld joints per hour and handle this or that substance faster and safer than a human; today's personal robot, in contrast, is rather limited and unintelligent—the equivalent of a six- to nine-month-old child.

B.O.B. comes with a program that allows him to navigate a living space and talk in a human-like voice.

On the bottom of the price scale—and the intelligence scale—is one of Androbot's creations: Topo. In his standard $495 configuration, he is simply a motorized hunk of plastic. He has no computer on board to direct his actions.

Instead, you hook a special controller to the RS-232 communications port on your computer. The controller sends infrared signals to Topo and tells him what to do. Any sequence of commands sent to the robot can also be stored simultaneously on disk to be retrieved later.

In addition, Topo sends information back through the wireless link to your computer, telling it how far he has gone and how much progress he has made in carrying out your instructions. Alternatively, you can control Topo directly with an infrared emitting hand-held joystick.

In some respects, Topo is the most advanced robot on the market, because even the most sophisticated computer and computer program can control his actions. The problem is that Topo must be near your computer to receive instructions.

Topo comes with a TopoForth disk that runs on an Apple II/IIe, Atari 400/800/1200, IBM PC, Texas Instruments 99/4A, Vic 20, or Commodore 64 computer. Since TopoForth is a standard version of the Forth language, original software—by the user or by third party programmers—can be custom designed for the robot.

Topo also comes in a $795 talking version with an on-board voice synthesizer. Like his motions, his voice is remote controlled via the computer-to-Topo infrared link. As with most speech synthesis devices, Topo uses text-to-speech algorithms to allow easier programming. With text-to-speech, you needn't learn a complex table of codes to produce understandable English.

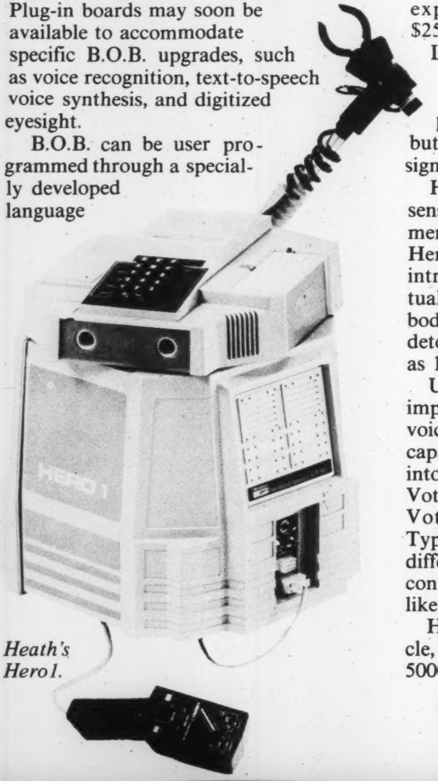
B.O.B

Topo's bigger—and smarter—brother is B.O.B. (for Brains on Board). The unit has two true 16-bit 8086 microprocessors built into it (compatible with the 8088 chip used in the IBM PC). Standard on the $2995 robot is 3Mb of RAM. B.O.B. needs two CPUs and so much memory because he does many things at once. Each 8086 chip regulates only a part of B.O.B.

B.O.B. comes with a program that allows him to navigate a living space and talk in a human-like voice (the speech synthesizer inside B.O.B. uses a linear predictive coding technique and draws on a ready set of digitized, pre-recorded phrases). As he converses, he randomly chooses from over one hundred stored words and lines. Infrared sensors mounted in his head attract B.O.B. to humans, who he may follow at will (and sometimes he doesn't; it depends on his mood). In the process, he avoids inanimate objects in his path via the ultrasonic sensors located in his head.

B.O.B. features the Androbus system (nearly everything in the Androbot line starts with *Andro*). With Androbus, B.O.B. has—the company claims—a limitless potential for expansion: through add-ons to his existing circuitry and the use of owner-created and commercially available software. Plug-in boards may soon be available to accommodate specific B.O.B. upgrades, such as voice recognition, text-to-speech voice synthesis, and digitized eyesight.

B.O.B. can be user programmed through a specially developed language called ACL (Androbot Control Language). Ready-made software for B.O.B. is expected to include AndroSentry, a home security/alarm package, and AndroFridge, a unique "me boss, you slave" program and accessory that permits the robot to fetch a can of beer (or Coke or Pepsi or 7-Up) for his master.



Heath's Hero1.

B.O.B. lacks some important features, however. The most obvious is that he has no arms or hands. B.O.B. just rolls around the room seeking out people and telling them jokes. He does have two fold down panels that hold objects (like cans of beer), but they can't reach out and grasp things.

Hero

As a matter of fact, the only personal robot on the market today that comes with an appendage is Heath's Hero 1 (which stands for **H**eath **E**ducation **RO**bot). Hero, who stands 20" high, has less CPU power and less memory than B.O.B. Built into Hero is a Motorola 6808 CPU along with 4K of RAM, and 8K of ROM. Both RAM and ROM are expandable. Assembled, Hero costs $2500; in kit form, only $1500.

You can program Hero to search for the brightest light in the room.

Like B.O.B., Hero has a bus port that allows you to experiment and hook additional things up the unit. The port is less user-friendly than B.O.B.'s, but that is because Hero was really designed as an educational tool for robotics.

Hero also incorporates an ultrasonic sensor that allows him to detect movement or calculate distances. One routine Hero does quite well is the detection of intruders. Point his moveable head (actually a flat plate on top of its squarish body) at a door or window, and he will detect the presence of an adult as much as 15 feet away.

Unique to Hero, and part of his impressive array of features, are his voice synthesis and "voice recognition" capabilities. The voice synthesizer built into Hero is based on the familiar Votrax SC-01 chip, the same one used in Votrax's text-to-speech synthesizer, Type 'N Talk. The chip can create 64 different vocal sounds. A four-step pitch control that helps create more human-like inflection is standard on the SC-01.

Hero hears sound in a 360-degree circle, over a frequency range of 200 to 5000 Hz which more than covers the

HELENA ON CREATIVITY.

Name:	Helena Paoli
Age:	9
Home:	Belvedere, California
School:	Bel Aire
Hobbies:	Drawing, playing with dolls, reading, swimming
Ambition:	To be a fashion designer
Favorite software:	Creature Creator™ by DesignWare

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"Lots of games — well, you just keep shooting or dodging things until you learn the pattern. Then you can beat it easily, and you get bored.

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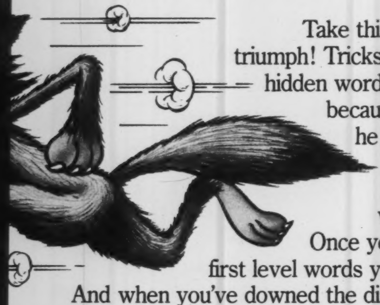

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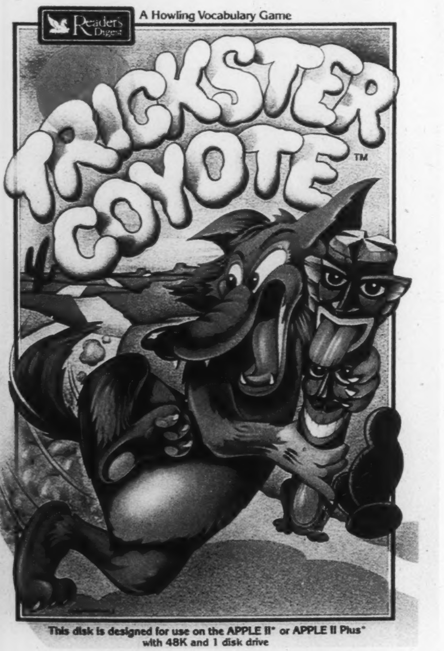
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approximate range of the human voice. The voice input circuitry of Hero converts the incoming sound to 8-bit digital words for processing.

The voice recognition unit really doesn't recognize speech as some of the more sophisticated models do. The processing approach taken by Hero limits his overall effectiveness, but it can be used to count syllables or sounds. For example, you can program Hero to fetch a can of either Coke or 7-Up. He determines which kind of soft drink to get not by examining the minute parts of speech that make up the words, but by counting syllables. Say "Mountain Dew" and he will still get you 7-Up.

Another of Hero's sensors is a light detector. The robot can be programmed to seek out a particular brightness of light (or the lack or presence of it). You can program Hero to search for the brightest light in the room, for instance. He will swivel his head slowly, taking in the entire room, and then decide which is the brightest light.

Hero isn't as much fun as B.O.B. To make Hero go anywhere, you must program his movements step by step into a keyboard on his noggin. You can also "quick teach" Hero by using what Heath calls a remote teaching pendant, an overgrown joystick that attaches to the robot through an 8-foot long cable. With the pendant, you can access all of the eight stepper motors that control Hero's body and arm movement.

RB5X

Another robot aimed primarily at the educational market, but with features more like those of an Androbot, is RB5X, one of the first personal robots to be offered commercially. As shipped from the factory, the $1495 RB5X has an ultrasonic range finding system and a unique set of eight bumper pads located around his base. A small photoelectric cell is mounted on the underside of his body. RB5X maneuvers around the house in a more or less hit or miss method; you just let him loose and he bounces around the room.

Depending on which bumper pad has been activated, the robot takes evasive action to clear himself and continues on. As he goes about his way, he is learning how to react to each collision. Soon, his event memory pieces all of the hits and runs together and compiles the best way to move around.

Inside RB5X is a National Semiconductor INS8073 CPU with 8K of RAM. The company claims that any computer with a standard RS-232C communications interface can connect to the robot, to add external software control. The robot is programmed in NSC Tiny Basic.

Perhaps the most unique aspect of RB5X is his "nesting" capability. B.O.B., Topo, and Hero require human masters to plug them in so their batteries can be recharged. But when RB5X feels hungry for more juice, he seeks out his own battery charger and plugs himself in. This is how it works: when RB5X senses he is low on fuel, he automatically puts himself into his nest-search program, and begins looking for a white piece of tape on the floor.

The white tape, which stretches from where RB5X is playing to the battery charger, helps the robot find his way back home. He follows the tape until he finds his charger, and plugs himself in. If he spots the middle of the tape and moves away from the charger, the robot automatically stops at the end of the tape, backs up, and retraces his steps.

RB5X can be upgraded to include an on-board speech synthesizer. In addition, RB Robots has introduced an arm for the unit, which gives him Hero-like capabilities. Perhaps the most useful add-on to RB5X, however, is a vacuum attachment that connects the lower skirt of the machine. Given the proper program, RB5X can move back and forth, avoiding obstacles, and vacuum the room. With the eight sensors mounted around his body, he will even detect if you have moved the furniture.

The RB5X.

RB5X
JOURNAL

Going Further

Although not quite as much fun to work as mobile robots, robotic arms can be useful around the house as well. There are several models currently available. Because they are made to lift heavier weights than Heath's Hero, which can lift only 16 ounces, they are more expensive and bulkier.

One is Microbot's Mini-Mover 5, a human-like appendage with six stepper motors to control such functions as wrist rotation, shoulder pitch, and elbow bend. The arm can be interfaced through a 3-foot cable to an Apple II or Apple IIe and most TRS-80 computers. Control of the arm is through a special extension of Basic that Microbot calls ArmBasic. Other robotic arms are the XR-1 from Rhino and Microbot's MIM-5.

Announced, but not yet available as of this writing, is a new automaton from Robotics International called Genus. The new robot, it is said, will include an extendable and usable arm, on-board memory and on-board microprocessing. The triple jointed arm, perhaps its most useful feature, retracts inside its near cylindrical body. It should be more than adequate for most chores. The cost for Genus, which is available in "sections," will be about $5000 for a well-equipped version. Robotics International says household attachments, such as vacuum cleaner wands, will be offered.

Perhaps the most unique aspect of RB5X is his "nesting" capability.

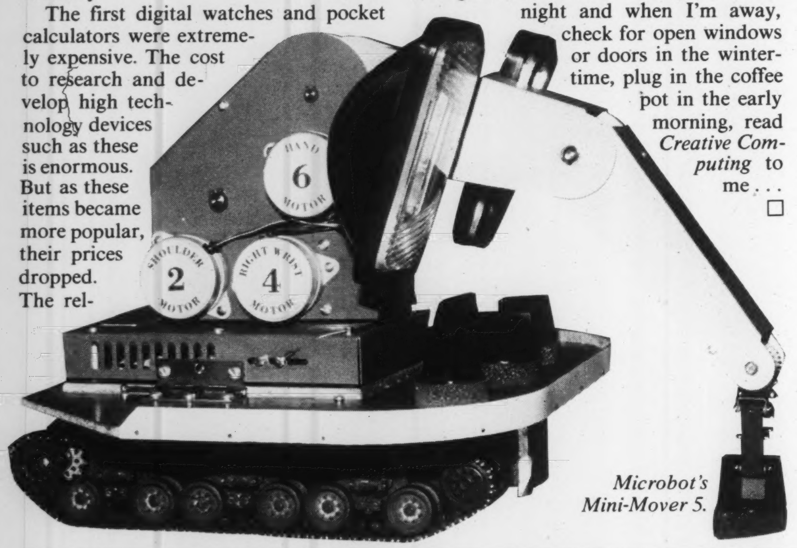
Glimpse Of The Future

What can we look forward to in future generations of personal robotics? Today's robots cater to the hobbyist and the gadgeteer. They are limited and a bit difficult to use. And many are meant more to educate than to entertain or serve.

Tomorrow's robot will do all these things and without much bother by the user. Given advances in computing technology such as cheaper and smaller memory, tiny hard disk drives, and sophisticated, special purpose control languages, the personal robot of tomorrow should go far. Soon—perhaps as soon as three to five years from now—specific applications programs for robots will be commonplace. A home security, room vacuuming, or bartending program (complete with jokes) might do for the robotics industry what *WordStar* and *VisiCalc* did for the computing industry.

The first digital watches and pocket calculators were extremely expensive. The cost to research and develop high technology devices such as these is enormous. But as these items became more popular, their prices dropped. The relatively high cost for robots—$495 to $5000—will surely drop, too, making it impractical for you *not* to own one.

How might you use a robot? I know how I would use mine: Feed the cat, fetch the mail, wake me in the morning, mix me a drink at 5:30 in the afternoon, get (and open) a can of soda from the refrigerator, watch over my house at night and when I'm away, check for open windows or doors in the wintertime, plug in the coffee pot in the early morning, read *Creative Computing* to me . . . □



Microbot's Mini-Mover 5.

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From Backyard
To Big Time

Thom Hogan

The CP/M operating system so popular today has its roots in the very genesis of microcomputing. The designer of CP/M, Gary Kildall, in the early 1970's was a software consultant for Intel, one of the first manufacturers of integrated circuits, and the inventor of the first "microcomputer on a chip," the 8088. Kildall's everyday job was as a computer science professor at the Naval Postgraduate School in Monterey, CA. His two jobs put him in a unique position to observe and tinker with the fledgling microcomputer industry.

Gary began collecting the pieces, that by 1973, formed a home grown microcomputer system. The main processor (the brains of the computer) and its memory were integrated circuits from Intel; the disk drive was a recycled test drive from Shugart; the input and output console consisted of a Teletype device.

Needing something to tie all these components together into something that could be used, Kildall wrote a simple "operating system" in his then-favorite language, PL/M. The result he called Control Program/Monitor, or CP/M for short. CP/M, then, is a set of software that controls the basic components of the computer—an operating system.

Kildall showed his earliest versions of CP/M to Intel, but the company declined to market or further develop the project. This isn't surprising, because in 1973 and 1974 microcomputers were a rarity, and the people who had them weren't exactly sure what they wanted to do with them. In addition, Intel already had spent considerable effort on their own operating system, ICIS.

But by 1975 several small companies were marketing microcomputers to curious hobbyists. When most of these companies developed computers that incorporated disk drives, they usually generated their own operating system, also. Had these pioneers—MITS (Altair), IMSAI, Polymorphic, and Processor Technology, for example—been able to get their products to consumers quickly, CP/M might not have become the quasi-standard operating system it is today.

The insatiable microcomputer owners, however, weren't about to wait for the industry leaders to come out with new products, so they bought whatever they could find. NorthStar, Vector Graphic, Cromemco, and several other companies

Gary Kildall

Adapted and excerpted from the forthcoming *CP/M User Guide*, third edition, published by Osborne/McGraw-Hill. Copyright 1983 by Thom Hogan, all rights reserved.

got their start selling pieces that could be added to the original IMSAI and Altair microcomputers.

Several of these small microcomputer manufacturers decided to eliminate a costly research and development stage and adopted Kildall's CP/M operating system for their products. Most notable among these smaller companies were Tarbell Electronics and Digital Microsystems, two firms that were among the first to ship working disk systems. Because these firms manufactured "add-on" components that could be used on virtually any system, owners of Altairs, Vectors, Polys, and others did not have to wait for the manufacturers of their computers to get around to producing drives. In addition, IMSAI had been shipping disk systems without any software to run them; they promised to ship an operating system as soon as it was ready. After trying to develop their own, IMSAI decided to turn out IMDOS, which was really a disguised version of CP/M.

After manufacturers began to deliver reliable disk drives, software developers launched the next vital phase in the evolution of CP/M.

User Enthusiasm

Another important element in CP/M history was the enthusiasm of its first users. These true hobbyists tackled apparently insurmountable problems in their pursuit of new knowledge and experience. Theoretically, CP/M-80 could link any 8088- or Z80-based microcomputer with any disk system, and soon a group of hobbyists with "mix and match" systems emerged to test Kildall's product. These hobbyists developed several refinements, and, more important, a strong and visible users' group.

The importance of the support of a strong users' group cannot be underestimated. During the infant years of the microcomputer industry, accurate product information was not readily available. Manufacturers often released products with incomplete documentation, computer stores were relatively unknown, and in some cases, users' groups were more stable than the companies that developed the product the group was formed to support.

After manufacturers began to deliver reliable disk drives, software developers launched the next vital phase in the evolution of CP/M. The key to making software development financially feasible is to write programs that run on as many different computers as possible. CP/M-80 was one of the few operating systems that could run on just about any 8080- or Z80-based microcomputer, and was not restricted to one type of disk drive. Obviously, it was a prime choice for software developers.

Fortunately for CP/M, the first programs that became available were development tools—programs to help programmers generate other programs. Among the development tools that helped establish CP/M as the leading operating system for microcomputers were CBasic (and its predecessor, EBasic), Microsoft Basic, and several special assembly language programs. These tools, in turn, were used to write application programs, such as general ledgers, database and inventory programs, and word processors.

The popularity of the CP/M operating system thus became part of an escalating pattern: CP/M spawned programming languages and development tools, which in turn gave birth to application programs. These CP/M-dependent application programs increased CP/M sales, which again led to an increased number of development tools being introduced. This upward spiral of sales leading to more tools leading to more application programs leading to more sales has continued unabated for several years, and shows no signs of ending.

Evolution

During this rapid growth in popularity, CP/M did not remain the same as it was when it was first introduced.

The original CP/M that Kildall wrote (and his wife, Dorothy McEwen, marketed for him through their jointly owned company, Digital Research) was called CP/M version 1.3. CP/M 1.3 had a few minor problems—after all, it was put together quickly and for Kildall's own use. So Kildall rewrote it, tightened up some of the code, and recreated some of the utility programs that came with it. This became CP/M 1.4. At about the same time, Digital Research sold the rights to CP/M 1.3 to Cromemco, who made some modifications of their own, creating CDOS (Cromemco Disk Operating System).

A few comments are in order about CP/M 1.4 and the equipment it was designed to work with. First, CP/M 1.4 was designed at a time when memory was expensive, and disk drives came in only one flavor: single density. Also, paper tape systems and Teletype consoles (keyboard with printer) were still extremely popular.

The result is that CP/M 1.4 was designed with the limitations of these devices in mind. CP/M 1.4 takes up little memory (and therefore is limited in what it can do), assumes no intelligence on the part of the accessories attached to the system (and is thus simplistic), and was designed to allow a mixture of then-available peripherals to be attached. In some respects, these are the characteristics that made CP/M popular and established its identity as a quasi-standard: it was not specific to a single computer and could work on a minimally-equipped system.

Computers changed in 1979 and 1980. With the introduction of programs like *VisiCalc* and *WordStar*, and with new hardware, such as higher capacity disk drives and low cost memory, computers began to be truly useful.

CP/M changed with the computers. CP/M 2.2 was to update the original operating system to make it more compatible with the changing microcomputer. Whereas CP/M 1.4 was severely limited in the amount of disk storage it could address, CP/M 2.2 was expanded to allow for up to 16 drives each with megabytes of storage space.

Other changes occurred, as well. Most of these were minor enhancements or modifications that made CP/M more flexible. The ability to address more than one type of disk drive at a time (such as mixed 8" and 5 1/4" systems) was allowed.

During the period 1979 to 1981, CP/M became self-perpetuating.

But the original features of CP/M were still evident; it remained compact and flexible. Digital Research concentrated on selling primarily to manufacturers and distributors, rather than to users. Thus, a small sales effort on the part of Digital Research often meant large numbers of users. Probably the best example of this was when Microsoft introduced the Z80 SoftCard with CP/M 2.2 for the Apple II computer. Within months, tens of thousands of new CP/M-80 users were added. (*Note*: When we refer to CP/M-80 in this article, we refer to CP/M versions 2.2 and 1.4.)

During the period 1979 to 1981, CP/M became self-perpetuating. Its popularity attracted software companies, which wrote software, which in turn attracted more users, who then attracted more manufacturers. This circular growth pattern accelerated very rapidly, with CP/M-80 going from about 300,000 users in 1979 to almost 1.5 million in early 1983.

But 1981 was the watershed year for CP/M. With the introduction of new microcomputers by computer giants like IBM, Hewlett-Packard, and Xerox, all of which are offered with the CP/M operating system standard or as an option, the number of users of CP/M began increasing at an accelerated pace. During this same year, however, the rapidly changing technology of computers once again caught up with CP/M, so Kildall and Digital Research once again went to work to refine the original operating system.

CP/M was originally designed to work on an 8080-based microcomputer. Not to disparage the poor 8080, but it just wasn't a state of the art central processor in 1981. After the 8080 came the Z80. Not only was the Z80 faster than the 8080, but its expanded instruction set allowed for better and faster software. Fortunately, a Z80 can perform any computer instruction that an 8080 can; therefore, the original CP/M can run on a Z80- or 8080-based microcomputer.

The speed of the Z80 invited computer designers to try to make microcomputers support more than one user at a time. In addition, the diminishing cost of microprocessors meant that a designer could simply add a processor for each user he envisioned. Multiuser microcomputer began to be popular.

Branches On The Tree

CP/M works only for a single user computer. Digital Research therefore started a second branch of the CP/M tree by creating a product called MP/M (apparently an acronym for Multiple Program/Monitor, although that has never been officially acknowledged).

MP/M works similarly to CP/M (i.e., someone who has used CP/M can generally learn to use MP/M in an hour or two), but is not exactly the same; software that works with CP/M doesn't always work under MP/M. One thing Digital Research transferred from CP/M to MP/M was the disk format. That means that a disk created on a MP/M system is directly compatible with a CP/M system (assuming the same disk density and size). It also means that data and some programs can be used on either a CP/M or MP/M system. This is an important attribute of the CP/M family of operating systems.

86-DOS was patterned after CP/M 1.4 with one very important difference.

Another branch of CP/M appeared with the introduction of 16-bit central processors. The first 16-bit processor to become available in systems was the 8086 (and its cousin, the 8088). Digital Research had always planned to come out with a CP/M-86, but was beaten to the punch by Seattle Computer Products, which offered a CP/M-like operating system they first called 86-DOS.

86-DOS was patterned after CP/M 1.4 with one very important difference: the disk format was changed and the resulting structure of information stored on the disk is entirely different.

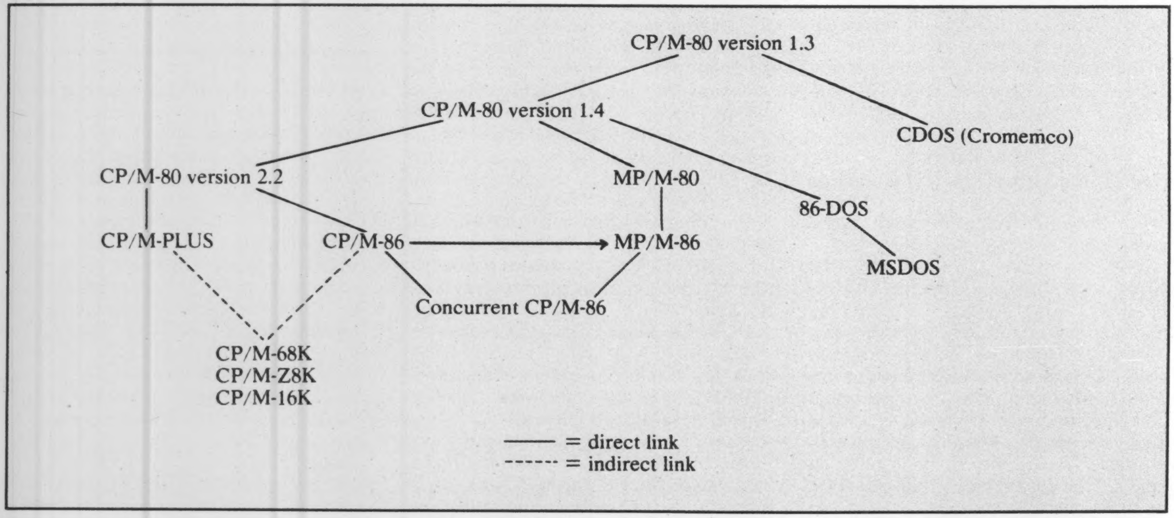
86-DOS went on to become Microsoft DOS, then IBM PCDOS, and is now generally referred to as MSDOS. While it is similar to CP/M and originated from CP/M-like beginnings, it is important not to confuse MSDOS with versions of CP/M.

Digital Research did go on to introduce CP/M-86, a version of CP/M that works on 8088 and 8068 central processors. While it, too, is similar to earlier versions of CP/M, it does have some differences in operation. Later versions of CP/M-86 are Concurrent CP/M-86, a version that allows one user to run multiple programs simultaneously, and MP/M-86, which allows multiple users to work from a single computer. As with MP/M, the 8086 versions of CP/M retain the same structure of information on disk, meaning two machines with different processors but the same disk drives can change data.

Our examination of the history of CP/M is not yet finished, however. In early 1983, Digital Research continued to improve on the original version and to expand CP/M to other central processors. Versions of CP/M for 68000 CPUs, Z8000 CPUs, and 16000 CPUs (called CP/M-68K, CP/M-Z8K, and CP/M-16K, respectively) are now available.

At the same time Digital Research was expanding CP/M to run on new central processors, they took what they had learned in these new versions and applied

Figure 1.



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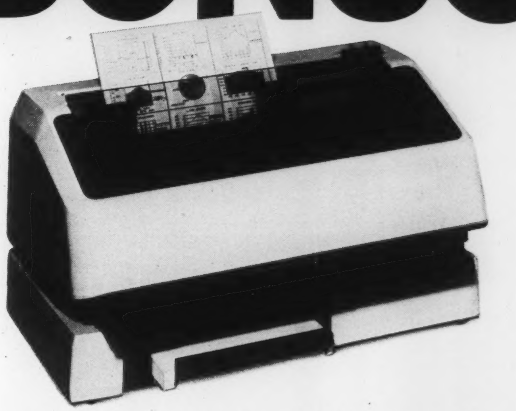

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it to the original version of CP/M. The result is a product they call CP/M-Plus. CP/M-Plus is ostensibly CP/M-80 version 2.2 with additions similar to those found in CP/Ms for other processors.

To get the utmost utility from CP/M, it is important to understand the development of CP/M over the last ten years, since much of what CP/M is today comes from the fact that it was designed to be used on a wide variety of quite different computer hardware. See Figure 1.

At present, it is estimated that over 500 computer manufacturers now offer CP/M-80 or CP/M-86 with their equipment. Almost two million users have CP/M on their computers. Even owners of microcomputers that do not have a 8080, 8086, 8088 or Z80, 68000, 16000, or Z8000 central processor are now able to make use of CP/M with add-on processing boards for everything from Apple and Atari computers to the Commodore 64.

From the modest beginnings of CP/M, it has become the most widely used operating system for microcomputers (and possibly for all computers if number of installations are counted instead of number of users). Many changes have been made to Kildall's original operating system, and, despite its simplicity, it can control even the most complicated equipment.

The Future

No history of CP/M would be complete without a peek at the future.

Digital Research continues to refine CP/M and keep its abilities current with the state-of-the-art in computing. The recent introduction of the GSX kernel, a set of graphics enhancements that allow CP/M to manipulate directly the graphics display of the latest computer systems, is one example. A networking kernel, and kernels for other specific computer hardware improvements are on the way. Osborne Computer Corporation's pioneering of automatic recognition of differing data formats is almost sure to work its way into future CP/M designs.

Digital Research continues to refine CP/M and keep its abilities current with the state-of-the-art in computing.

More interesting, however, are announcements that Digital Research plans to support the *VisiOn* interface (a product that promotes integration of different types of programs and allows simultaneous display of them) and that Concurrent CP/M-86 is being redesigned to support both CP/M and MSDOS data and program files.

These two announcements indicate the two directions that drive future CP/M development: *VisiOn* points towards the future of computer software, and CP/M will be there; combining MSDOS and CP/M capabilities takes already existing products and attempts to combine them into a single standard product.

Recently, there has been talk of the imminent demise of CP/M, due to IBM's adoption of MSDOS as their standard operating system. Given the effort Digital Research has put into making CP/M address all aspects of microcomputing in the past, and given the number of CP/M users already in existence, such doomsaying is most likely only wishful thinking on the part of competitors. Like it or not, CP/M is here to stay. ☐

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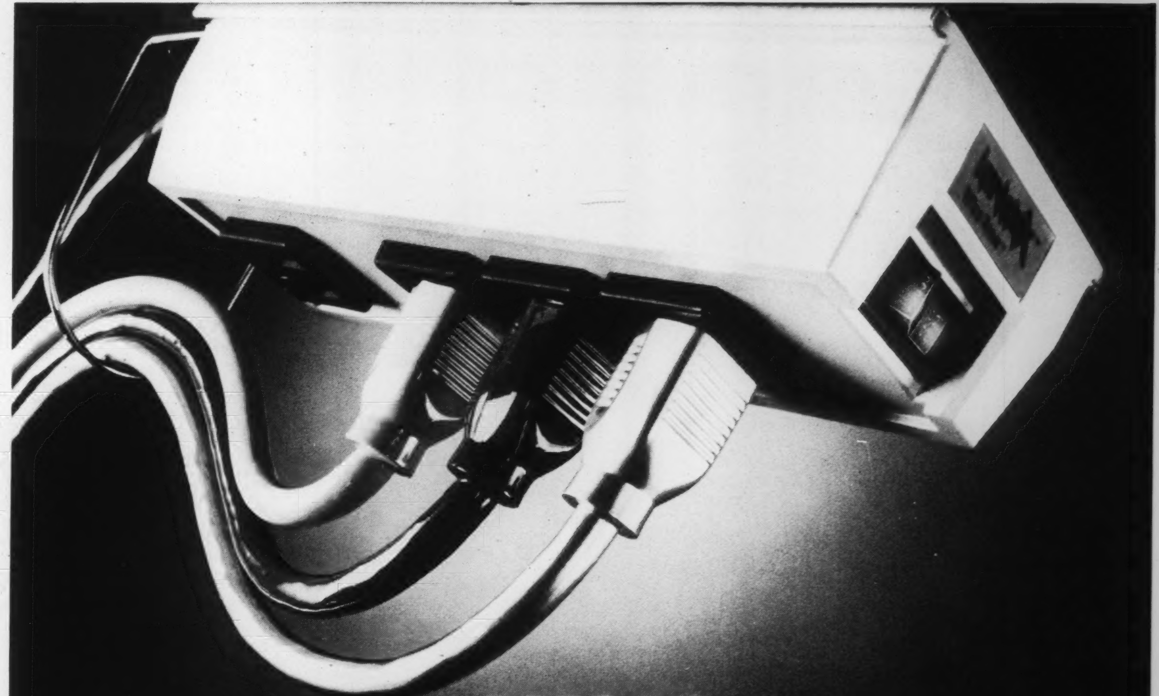

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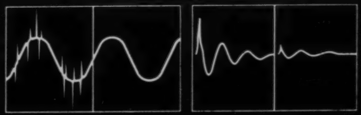

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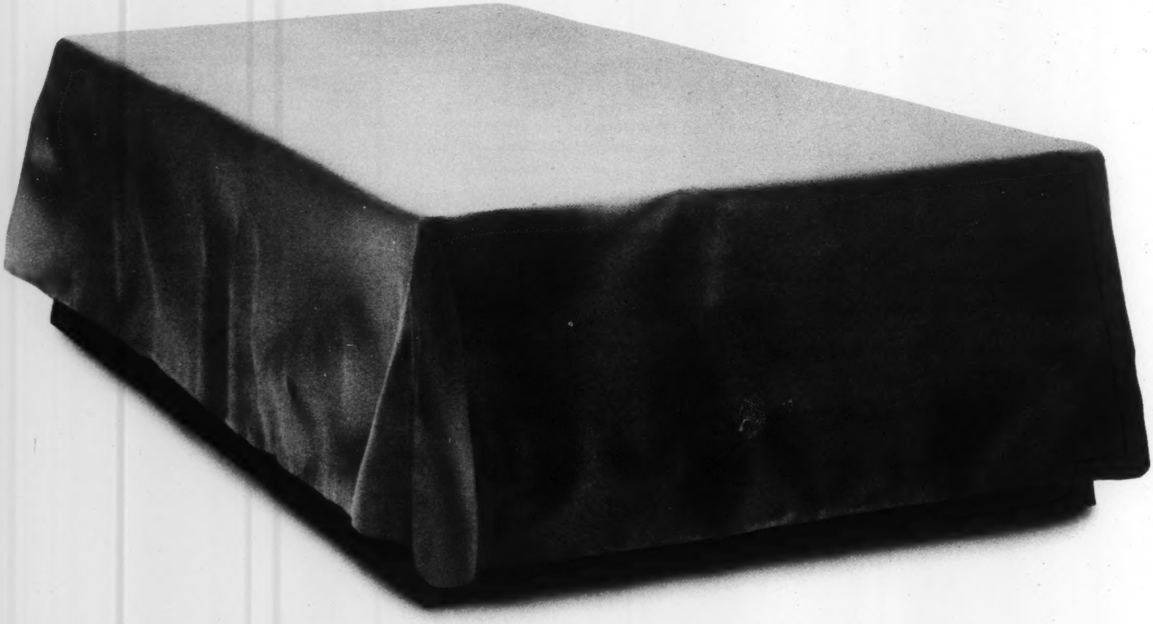

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The CBasic Clinic

Part One

John A. Libertine

Would you be interested in a new computer language that allows you to write programs in good old simple Basic yet offers most, if not all, of the advantages of structured languages like Pascal, Ada and PL/1? It also conserves memory, runs faster, eliminates line numbering, gives more accurate math results, and lets you use both string and numeric variable names up to 31 characters long (*all* of them significant). Perhaps most important, the handling of both random access and sequential files is quite advanced.

Everything I have just said is true (if not conservative), yet this language is no state of the art breakthrough. In fact, hundreds of thousands of computer users have it available right now but haven't tried it. Every Osborne owner has it, as do most Xerox 820 buyers. It's a "sleeper" called CBasic. It has been around since 1977, which in computer time is ancient history. Professional programmers (especially in the business areas) have long known and used its power. It is time we home computer users learned why it keeps getting rave notices from those who make their living writing applications software.

I shall make one promise. If you get into CBasic, you will never be happy going back to your interpretive Basic. Do you know that "interpretive" Basic is the most common language for microcomputers? Microsoft Basic is the best known. It (or a close relative) is used by Radio Shack, Apple, IBM, Atari, and many other computer manufacturers. *Interpretive* means that each line of code is interpreted as the program is run. There are advantages. For "quick and dirty" programs, it is easy to debug and you can write "free form" without getting into too much trouble. From the pro's viewpoint, these can also be drawbacks, however.

> ***Interpretive Basic allows (even encourages) sloppy programming.***

Without getting into the technicalities, interpretive Basic allows (even encourages) sloppy programming, which leads to wasted memory. CBasic is a *compiled* Basic. Your entire program is written and then converted into machine code (or an intermediate code) which can be run with a significant saving in memory and time. You are permitted (and in fact encouraged) to use a "structured" approach in programming. This can make your programs highly organized, modular, and easier to update and revise—much more about this later. For now, let me assure you that the difference is noticeable and measurable.

What I hope to do in this short series is get you started with CBasic. We will write simple programs to illustrate the advantages of the language and if you will bear with me (and do a little extra "homework" on your own), you should be able to continue to the point where even a sophisticated application won't throw you for a loop.

Historical Background

A little history might be useful here. CBasic is the creation of Gordon Eubanks, Jr. It started as a college project and resulted in his forming a very successful company called Compiler Systems. Recently, he merged with Digital Research (the CP/M people). Mr. Eubanks is now a vice president at Digital and he continues to improve and advance CBasic. It is available for virtually any computer that runs under CP/M (or its derivatives MP/M, CP/M-86, etc.). It is available from computer manufacturers (Osborne and Xerox for example) and from most software dealers.

Prerequisites

To use CBasic, you need CP/M, about 48K minimum RAM, and at least one disk drive with a couple of hundred

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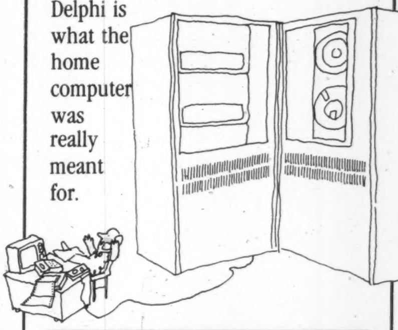

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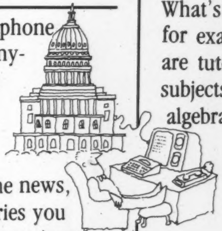

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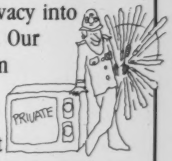

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Listing 1.

```
10 REM THIS PROGRAM AVERAGES A LIST OF NUMBERS
20 REM INITIALIZE VARIABLES
30 LET A = 0
40 LET B = 0
50 LET C = 100
60 PRINT:PRINT:PRINT:PRINT
70 PRINT "HOW MANY NUMBERS ON YOUR LIST?"
80 INPUT D
90 REM ENTRY LOOP
100 FOR I = 1 TO D
110      PRINT:PRINT
120      PRINT "ENTER NUMBER BETWEEN -100 AND +100"
130      INPUT E
140      LET A = A + E
150      IF E > B THEN LET B = E
160      IF E < C THEN LET C = E
170 NEXT I
180 LET F = A/D
190 PRINT:PRINT:PRINT:PRINT
200 PRINT "THE AVERAGE OF YOUR NUMBERS IS: ";F
210 PRINT
220 PRINT "THE HIGHEST NUMBER IS: ";B
230 PRINT
240 PRINT "THE LOWEST NUMBER IS: ";C
250 END
```

K capacity. For any serious programming, you should have 64K minimum RAM and two disks. Since you must write the programs with a text editor or word processor, you should have one like *WordMaster* or *WordStar*. You could use the ED function of CP/M, but I think that is being a masochist of the first order. CP/M is great, but ED is probably its weakest link.

For purposes of experimentation, you can make do with ED, but for any real work get a text editor (or better, get *WordStar*, which is both a great word processor and (in the N, non-document, mode) a text editor).

There is one more modest investment you must make if you are going to be serious about CBasic. For $15 to $20, you can buy a book which will help you start off on the right foot. You need this book because the documentation that comes with CBasic is at best formidable and too often approaches the incomprehensible for even the seasoned user.

Buy *CBasic User Guide* published by Osborne/McGraw Hill. Its authors include Gordon Eubanks, Jr., Adam Osborne, and Martin McNiff. The publisher states that CBasic is as easy to learn as Basic and may be the only computer language you will ever have to learn. Others have said it is the most advanced of the Basics. I agree with all of the above.

The best advice I can give is to sit down at your computer and try CBasic. The cost of CBasic is about $125 to $150. I don't know of any other complete and proved-in-use language for anywhere near that bargain price. For those who really get into it, an advanced, upwardly compatible version (CBasic Compiler), which offers even more power, speed and options is available. But you can do almost everything without the advanced version, so don't think CBasic is a beginner's, experimental, or stripped-down version like many of the languages being offered today.

Listing 2.

```
REM This program averages a list of numbers
REM Initialize variables
TOTAL = 0
HIGHEST.VALUE = 0
LOWEST.VALUE = 100
PRINT:PRINT:PRINT:PRINT
INPUT "How many numbers on your list?";TOTAL.NUMBERS
REM Entry loop
FOR INDEX = 1 TO TOTAL.NUMBERS
        PRINT:PRINT
        PRINT "Enter number between -100 and +100"
        PRINT
        INPUT "Enter number:";NUMBER
        TOTAL = TOTAL + NUMBER
        IF NUMBER > HIGHEST.VALUE THEN HIGHEST.VALUE = NUMBER
        IF NUMBER < LOWEST.VALUE THEN LOWEST.VALUE = NUMBER
NEXT INDEX
AVERAGE = TOTAL/TOTAL.NUMBERS
PRINT:PRINT:PRINT
PRINT "The average of your numbers is: ";AVERAGE
PRINT
PRINT "The highest number is: ";HIGHEST.VALUE
PRINT
PRINT "The lowest number is: ";LOWEST.VALUE
```

Getting Started

Okay, enough theory. Let's get started. To begin with, you must understand that CBasic is written on a text editor or with ED. You do *not* use CBasic to write the program. The program name uses the CP/M format (up to eight characters followed by a period followed by an extension of three characters). The extension must be .BAS. (TESTPROG.BAS for example.)

Once the program is written and stored on disk, it must be *compiled*. This is where you start to use the CBasic program itself. Included on the CBasic disk is a file called CBAS2.COM. Assuming your own program is on the same disk, you would go into CP/M, get the A prompt and type

```
CBAS2 TESTPROG (RETURN)
```

(Note that you do *not* have to type the .BAS extension. The compiler assumes it is there and will not work if it is not.)

The compiler then scrolls the entire program on your screen. If it is a long one, you can stop it to check for errors or whatever by hitting CONTROL-S (hold the control key down while you enter s). Hitting CONTROL-S again re-starts the scrolling. If there are any errors in syntax or format, they will appear on the screen.

If all goes well and there are no errors, you then use the second CBasic program: CRUN2.COM. Enter

```
CRUN2 TESTPROG (RETURN)
```

Now, your program will run (on the screen and/or your printer depending on how you set it up). There is again a chance that you have made an error (for example, asking the computer to do something impossible such as divide by zero). In this case, the program will stop at that point and note the error on your screen.

This is called a *run time* error as opposed to the previous *compiler* error. In either case, you must go back to your text editor, correct the problem and recompile before running. A complete list of error codes and their meanings can be found in your documentation and in *CBasic User Guide.*

When you compile, CBasic automatically writes a second file. This has the same name as your program but carries the extension .INT for *intermediate*. This is the file to use when you run the program. If your disk space is limited, you need only the .INT file plus CRUN2.COM to run your program successfully.

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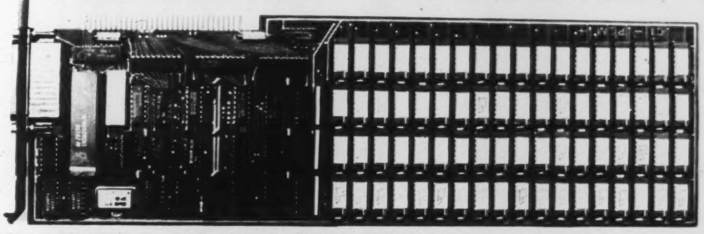

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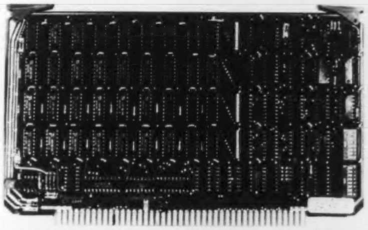

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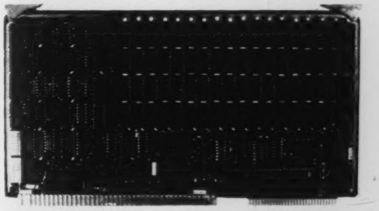

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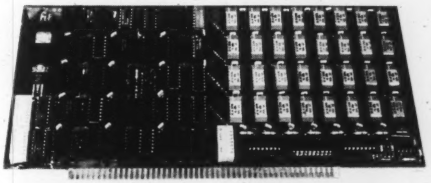

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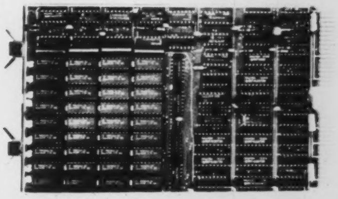

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Practice

If this all sounds confusing, don't despair. It will become quite plain as you do it. And that is exactly what we will do to end this introductory session. We will assume that you have at least some knowledge of Basic, so let's take a very simple program originally written in MBasic and change it to CBasic. Look at Listing 1.

As you can see, this MBasic program allows you to enter several numbers in the range of -100 to +100. It then adds them up and averages them. Listing 2 is the same program in CBasic.

Looks a little different, doesn't it? Does it remind you of Pascal? To begin with, you will notice there are no line numbers. CBasic doesn't require them (unless you refer to one specifically as in a GOTO or GOSUB statement).

Also note that the variable names can be much longer and more descriptive. This makes for easier reading and debugging. In this primitive program, those are the major differences, but note a few minor ones: the assigning of variables does not require the word LET (although it would not hurt to use it). There is no END statement; the compiler puts it in automatically. The INPUT syntax is simplified. See if you can find any others. Actually, the two programs are so similar that you can actually compile the MBasic program as written here into CBasic. That will not be true as we get into more advanced work, however.

Time to get down to work: Type out the CBasic program above using ED or the Non-document mode of *WordStar* or your text editor. Call it TESTPROG.BAS. When you have carefully proofread it, store it on disk. Now, leave your text editor and go to CP/M. From the A>prompt, type

```
CBAS2 TESTPROG
```

(note one space between the two names) and hit RETURN. The CBasic copyright notice will come up first followed by your program. The program shown in Listing 3 should appear on your screen.

What's this? There are line numbers! Right, the compiler puts them in to help you make corrections. They are not really part of the program, but they do come in mighty handy in a long program. For example, suppose you have an error in line 467. With most text editors, you can go directly there, make your correction, and re-store the program. You then re-compile (without showing any errors we hope) and be ready to run. Note also the five lines at the end of the program. For now, the only important one is the first: No Errors Detected. Later you will find use for the others.

If you do have an error, the listing will show what kind it is directly below the line where the error was made. The most common is likely to be an SE error. This is a syntax error (you have a grammatical mistake in the CBasic language). Chances are that you forgot to put in a quotation mark at the start or end of a string. Check also that you have not left out an equal sign or semi-colon. All Basics are fussy about such things.

Variable names can be much longer and more descriptive.

Now comes the fun part. From the CP/M A prompt, run the program by typing

```
CRUN2 TESTPROG (RETURN)
```

Answer the questions as they come up on the screen and you will have your average printed out along with your highest and lowest entries as a bonus. You have written and run your first CBasic program. Don't be overwhelmed. From such modest starts, great things will come.

Before we meet again, let me give you a couple of assignments to work on. First, get the *CBasic User Guide* book and start reading right from the beginning. Next, write out, compile, and run the first program above (the one written in MBasic). Do give it a different name (TEST2.BAS for example) or you will confuse your computer and yourself. Be sure to follow the spacing *exactly*. CBasic does not allow condensing by eliminating spaces as in, for example, FORI=JTOK. If you think for a moment, it makes sense. CBasic permits long variable names. Therefore, FORI is read as an assignment for the variable JTOK (LET FORI=JTOK).

Note the similarities and differences on the two compiled listings. For instance, in the second one, you will note that an asterisk follows every line number instead of a colon. Can you figure out why?

For those of you who know Basic, here are a couple of challenges. You note that the program asks you to tell it how many numbers you will enter in total. Can you re-write this so that you can enter any number of numbers without prestating the quantity? Of course, you will have to find a way to tell the program when the last number has been entered. While you are at it, how about changing the program so that the numbers entered are not limited to the range -100 to +100?

I hope this has been enough of an eye-opener to inspire your interest. As we go on, you will find the simple examples above can be expanded into rather sophisticated applications. ☐

Listing 3.

```
A>  CBAS2 TESTPROG

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     1: REM This program averages a list of numbers
     2: REM Initialize variables
     3: TOTAL = 0
     4: HIGHEST.VALUE = 0
     5: LOWEST.VALUE = 100
     6: PRINT:PRINT:PRINT:PRINT
     7: INPUT "How many numbers on your list?";TOTAL.NUMBERS
     8: REM Entry loop
     9: FOR INDEX = 1 TO TOTAL.NUMBERS
    10:         PRINT:PRINT
    11:         PRINT "Enter number between -100 and +100"
    12:         PRINT
    13:         INPUT "Enter number:";NUMBER
    14:         TOTAL = TOTAL + NUMBER
    15:         IF NUMBER > HIGHEST.VALUE THEN HIGHEST.VALUE = NUMBER
    16:         IF NUMBER < LOWEST.VALUE THEN LOWEST.VALUE = NUMBER
    17: NEXT INDEX
    18: AVERAGE = TOTAL/TOTAL.NUMBERS
    19: PRINT:PRINT:PRINT:PRINT
    20: PRINT "The average of your numbers is: ";AVERAGE
    21: PRINT
    22: PRINT "The highest number is: ";HIGHEST.VALUE
    23: PRINT
    24: PRINT "The lowest number is: ";LOWEST.VALUE
    25: END
NO ERRORS DETECTED
CONSTANT AREA:       8
CODE SIZE:         318
DATA STMT AREA:      0
VARIABLE AREA:      56
```

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Logic and Recursion: The Prolog Twist

Jesse M. Heines
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Britain's young Prince William has been born into a famous family. As he grows up he will become aware of the distinguished ancestry which links him with several centuries of British monarchs through both his father and his mother.

According to current reports, the popular Prince still appears to lack the physical and intellectual power to carry out an exhaustive search for his forebears himself. However, he may already know enough to initiate a computer-aided search: he knows his immediate ancestors, his parents, as well as the next level, the parents of his parents.

Given the names of William's father and mother, a database of names connected by parent-child relationships, and an effective search strategy, one should be able to write a relatively simple program to list his geneology.

The key to the programming task is that the problem is *recursive*: for each level of ancestors, the next level can be determined by searching for the ancestors of those ancestors, and so on until no additional ancestors can be found. A recursive problem is one that can be broken down into two or more subprograms, at least one of which is the same as the original problem with a different set of conditions or arguments.

This article approaches the issue of recursion by describing a traditional programming problem and comparing the ways it is implemented in four languages: Basic, Pascal, Lisp, and micro-Prolog. It is a programming exercise and does not purport to be an exhaustive discussion of recursion or the recursive properties of the four languages.

No claims are made that recursion is a "good" programming technique, and we do not discuss its relative strengths and weaknesses as compared to other techniques such as iteration. Our purpose is simply to present an interesting illustration of recursion across four languages to provide insight into the subtle properties of each language.

The Factorial Function

We will use the factorial function to illustrate recursion throughout this article; as it is a classic example of recursive programming. The factorial of any positive integer n is the product of all positive integers from 1 to n and is represented by the symbol n! By definition, the factorial of 0 is 1. Therefore:

$0! = 1$
$1! = 1$
$2! = 2 \times 1 = 2$
$3! = 3 \times 2 \times 1 = 6$
$4! = 4 \times 3 \times 2 \times 1 = 24$

Before proceeding to coding in a particular language, it will help if we can develop a formal specification of the factorial function. This can be done using a logical notation, starting with the definition given above:

[1] 0 has factorial 1

The factorial of a positive integer is the product of that integer and the factorial of the integer to which it is the successor:

```
[2]  u has factorial v if 0 < u and
                          u is the successor of w and
                          w has factorial x and
                          x times u = v
```

The successor relationship is specified as:

[3] u is the successor of w if w + 1 = u

In traditional computing terms, the simplest way to solve the factorial problem is via iteration. This can be illustrated with the Basic program in Listing 1, using a FOR/NEXT loop to accomplish the iteration.

Listing 1.

```
10 INPUT N                     Enter the number whose fac-
                                 torial is to be computed.
20 LET ANSWER = 1              Initialize the ANSWER to 1.
30 IF N=0 THEN 70              Handle the special 0 case.
40 FOR K=N TO 1 STEP -1        Begin looping from N to 1.
50   LET ANSWER = ANSWER * K   Multiply the ANSWER by the
                                 loop index.
60 NEXT K                      Iterate over the next index.
70 PRINT ANSWER                Print the answer.
99 END                         Stop.
```

A flowchart for the iterative solution is shown in Figure 1. This program certainly does the job, but it is not a very clear representation of the factorial function in terms of the formal function specification given above. This lack of clarity is *not* because the program is written in Basic, as will be seen in the next section. It is because the solution uses iteration.

Recursion may or may not be more computer efficient, and it may or may not be easier to program. These issues are beyond the scope of this paper. However, as shown by the flowchart in Figure 2, recursion allows one to code the factorial function in a manner that is a much clearer representation of the formal function specification. The sections that follow illustrate how the recursive solution is programmed in four different languages.

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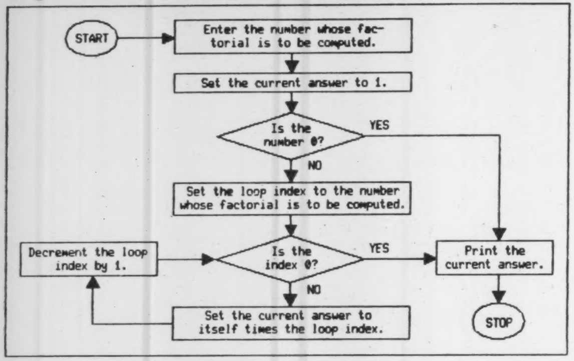
START
Enter the number whose factorial is to be computed.
Set the current answer to 1.
Is the number 0?
YES
NO
Set the loop index to the number whose factorial is to be computed.
Decrement the loop index by 1.
Is the index 0?
YES
NO
Print the current answer.
Set the current answer to itself times the loop index.
STOP

Figure 1. Flowchart of an interactive factorial function.

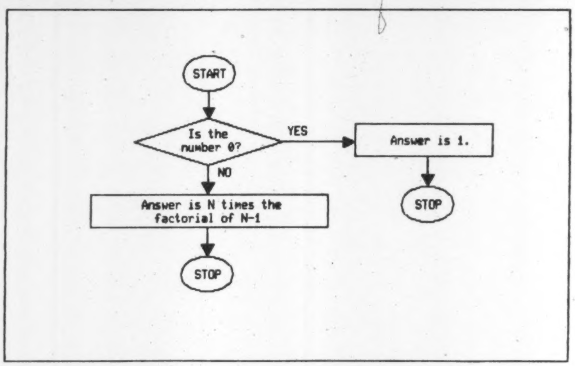

Figure 2. Flowchart of a recursive factorial function.

A Basic Implementation

Not all languages allow recursion, but this is really more a property of the language *implementation* than the language *design.* As stated earlier, a detailed technical discussion of the language implementation requirements for recursion is beyond the scope of this paper. But even Basic, that most maligned of computer languages, allows recursion in some implementations.

Just to demonstrate that it can be done, Listing 2 shows the code for a recursive implementation of the factorial function written in Digital Equipment Corporation's Basic +2.

Listing 2.

```
10 DEF FNF(X)                          Begin the function
                                         definition.
20    IF X=0   THEN   LET FNF=1        Handle the 0 case.
30    IF X<>0 THEN   LET FNF=X*FNF(X-1) Handle all other
                                         cases.
40 FNEND                               End the function
                                         definition.
```

When the symbol FNF is used alone on the left side of the equal sign in lines 20 and 30, it represents the result that the function returns. When FNF (x-1) is used on the right side of the equal sign in line 30, it represents a recursive call to function FNF with a new argument (the original argument minus 1). The function is initially called with a statement such as:

```
100 LET F = FNF (4)
```

This function can be made more readable and efficient by using other advanced features of Basic +2, but we needn't proselytize further here.

A Pascal Implementation

While recursion may be somewhat foreign to Basic programmers, it should be familiar to Pascal programmers. Following is the code for a recursive Pascal definition of this function:

```
function factorial (x:integer) :    integer;
                                    (declare the start of an
                                    integer function with one
                                    integer argument)
begin                               (begin definition block)
    if x = 0 then factorial := 1    (handle the 0 case)
           else factorial := x*     factorial (x-1);
                                    (recurse using the orig-
                                    inal argument minus 1)
end;                                (end definition block)
```

As in the Basic implementation, when the symbol "factorial" is used alone on the left side of the := sign it represents the result that the function returns. When it is used on the right side of the := sign within its own function definition, it represents a recursive function call. A Pascal statement for calling this function would have the form:

```
f := factorial (4);
```

A Lisp Implementation

With the recursion concept firmly in mind, we are now ready to go a bit further by looking at two interesting languages that are often used for logic and artificial intelligence applications. The first is Lisp:

```
(defun factorial (x)      ; begin the function
                          ; definition
 (cond                    ; begin a conditional block
  ((equal x 0) 1)         ; if the "equal" relation is
                          ; true when x is compared to
                          ; 0, return 1
  (t (times x (factorial    (difference
                              x 1))))))
                          ; in all other cases, return
                          ; the product of x and the
                          ; factorial of the difference
                          ; between x and 1
```

This code may be difficult to follow for readers who are not used to "prefix" notation, but this should be only a minor stumbling block. Prefix notation puts the operation first, followed by the two arguments. Thus, (equal × 0) means "if x equals 0," and (difference x 1) means "x minus 1." The comment following the last line of the code translates the recursive call into English. A Lisp statement to call this function equivalent to the two previous illustrations would look as follows:

```
(setq f (factorial 4))
```

which sets variable f to the value returned by the function call (factorial 4).

One of the reasons for showing the Lisp implementation is that it is relatively easy to trace Lisp functions to demonstrate the recursive calling sequence. A trace of the above call to compute the factorial of 4 is shown below. The first number in each line is the recursion level. The number is parentheses at the end of each ENTER FACTORIAL message is the *argument* with which the function is called. The number at the end of each EXIT FACTORIAL message is the *result* returned by that recursion level.

```
(1 ENTER FACTORIAL (4))
  (2 ENTER FACTORIAL (3))
    (3 ENTER FACTORIAL (2))
      (4 ENTER FACTORIAL (1))
        (5 ENTER FACTORIAL (0))
        (5 EXIT FACTORIAL 1)
      (4 EXIT FACTORIAL 1)
    (3 EXIT FACTORIAL 2)
  (2 EXIT FACTORIAL 6)
(1 EXIT FACTORIAL 24)
```

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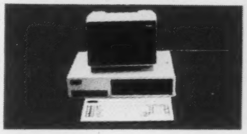

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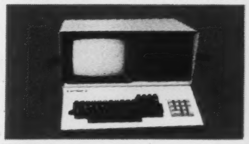

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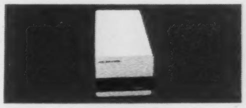

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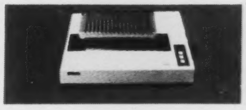

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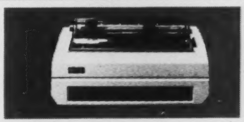

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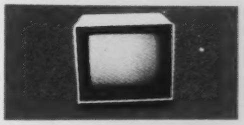

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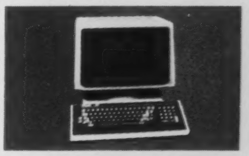

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A Micro-Prolog Implementation

Prolog is different from the three languages already discussed. Although there have been a variety of implementations since 1972, Prolog has received considerable attention in recent months, partly due to its adoption by the Japanese as the starting point for their Fifth Generation machines, which are to be based on logic programming.

The difference between Prolog and the other three languages is that Prolog is *declarative*, while the others are *procedural*. That is, rather than telling the computer *how* to compute the factorial of a number, in Prolog one tries to tell the computer what the factorial of a number *is*.

Micro-Prolog is an implementation of Prolog for microcomputers. Since 1980 it has been available for microcomputers with the Z80 microprocessor and the CP/M operating system. It is currently being implemented for a wide range of other microcomputers such as the Sinclair Spectrum, BBC micro, Apple, and Commodore 64.

Returning to our initial formal specification of the factorial function, we can see that little work is required to code the function in micro-Prolog. The sentence [1] in the specification can be used pretty much as it stands, adding only a hyphen in the relationship name:

[4] 0 has-factorial 1

This is the simplest type of micro-Prolog statement because no *conditions* are involved. More complex micro-Prolog statements can be thought of as *rules* that define conditions under which certain assertions are true. Sentence [2] in the formal specification can be rewritten into such a rule using the micro-Prolog convention where variables are X, Y, Z, x, y, z, X1, Y1, Z1, x1, y1, z1, etc., and the built-in arithmetic of the TIMES program and the LESS relation. (Note that the uppercase and lowercase letters represent different variables in this version of micro-Prolog.)

```
[5] X has-factorial Y if
      0 LESS X and
      X is-the-successor-of Z and
      Z has-factorial x and
      TIMES (X × Y)
```

This definition of the "has-factorial" relation is recursive because the relation name "has-factorial" appears as one of the conditional clauses within its own definition. Since X is defined by the previous clause to be the successor of Z, Z must be X-1. Thus, the recursive call in the clause "Z has-factorial x" is actually computing the factorial of X-1.

The specification of "is-the-successor-of" given in Sentence [3] is coded in micro-Prolog using the built-in SUM program:

[6] X is-the-successor-of Y if SUM (Y 1 X)

The micro-Prolog query for finding the factorial of 4 is:

```
Which (x 4 has-factorial x)
```

This is read, "Which values of x are there such that the relation 4 has-factorial x is true?"

Such a query follows the same pattern as queries to databases in micro-Prolog. Indeed, in Prolog, there is no distinction between program and database. A program consists of statements about relationships between individuals, which may be in the form of facts or rules.

The Promise of Logic Programming

Given only this exposure to recursion in Lisp and micro-Prolog, one might prefer Pascal or even Basic. The syntax of Lisp and micro-Prolog may appear unfamiliar, and some might even find it initially difficult to conceptualize something like the factorial function in terms of rules. The syntactic objection might be waved off by saying "one gets used to it," but the conceptual barrier warrants more explanation.

First, one must realize that neither Lisp nor Prolog was designed for mathematical calculation. The reader is referred to the texts listed at the end of this paper for a full discussion of their design considerations. Second, if all one wants to do is answer the question, "What is the factorial of n?," the authors agree that one might as well simply use a calculator with the appropriate function key.

But now the Prolog twist. We have seen that the factorial of 4 can be computed in Basic by using the statement:

```
LET X = FNF (4)
```

and in Pascal by:

```
x := factorial (4);
```

and in Lisp by:

```
(setq x (factorial 4))
```

and finally in micro-Prolog by:

```
Which (x 4 has-factorial x)
```

In the three procedural languages, one cannot use the functions defined in this paper to find out what number 24 is the factorial of. That is, one cannot write statements such as:

```
24 = FNF (x)
24 := factorial (x);
(setq 24 (factorial x)
```

Since the Prolog definition is based on logic, however, one can *theoretically* use it to solve the problem by posing the query:

```
Which (x x has-factorial 24)
```

This is the promise of logic programming: rule-based systems comprehensively defined can be run backwards as well as forwards. Unfortunately, implementation constraints on present machines restrict numerical applications at the present time.

The major problem is that the built-in micro-Prolog relations LESS, SUM, and TIMES are not declarative. They are machine-coded functions that perform their operations using standard procedural techniques. If they were declarative, one should, indeed, be able to get an answer to the backwards question posed above.

Interestingly enough, it is possible to write declarative versions of the LESS, SUM, and TIMES relations. The code for accomplishing this is provided below.

We begin by declaring successor relationships:

```
1 is-the-successor-of 0
2 is-the-successor-of 1
3 is-the-successor-of 2
4 is-the-successor-of 3
5 is-the-successor-of 4
6 is-the-successor-of 5
```

Using these relationships, we can then declare the rules by which one determines whether one number is less than another:

```
X is-less-than Y if
   Y is-the-successor-of X
X is-less-than Y if
   Z is-the-successor-of X and
   Z is-less-than Y
```

The first rule handles cases where Y is one greater than X, while the second rule uses recursion to handle all other cases. Given these relationships, we can now define the "sum" relation declaratively:

```
sum (0 0 0)
sum (0 X X) if
    0 is-less-than X
sum (X 0 X) if
    0 is-less-than X
sum (X Y Z) if
    0 is-less-than X and
    0 is-less-than Y and
    X is-the-successor-of x and
    sum (x Y y) and
    Z is-the-successor of y
```

The first rule says that the sum of 0 and 0 is 0. The second rule says that the sum of 0 and X is X if 0 is less than X. The third rule says that the sum of X and 0 is X if 0 is less than X. The fourth rule says that the sum of X and Y is Z if 0 is less

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than both X and Y, X is the successor of some number x, and the "sum" relation is true such that x plus Y is y when Z is the successor of y. In essence, the recursive call in the last rule breaks down the problem of finding the sum of 2 and 3 as follows:

```
2 + 3 = (1 + 1) + 3
      = 1 + (1 + 0) + 3
      = (1 + 0) + (1 + 0) + 3
      = (1 + 0) + (1 + 0) + (2 + 1)
      = (1 + 0) + (1 + 0) + 2 + (1 + 0)
      = (1 + 0) + (1 + 0) + (1 + 1)
        + (1 + 0)
      = (1 + 0) + (1 + 0) + 1 + (1 + 0)
        + (1 + 0)
      = (1 + 0) + (1 + 0) + (1 + 0)
        + (1 + 0) + (1 + 0)
```

and returns the answer 5 by finding the successor of the successor of the successor of 0!

The "times" relation can be defined declaratively in terms of the above "sum" relation:

```
times (0 0 0)
times (0 X 0) if
    0 is-less-than X
times (X 0 0) if
    0 is-less-than X
times (X Y Z) if
    0 is-less-than X and
    0 is-less-than Y and
    X is-the-successor-of x and
    times (x Y y) and
    sum (Y y Z)
```

Interpretation of this definition is similar to "sum." We now have fully declarative definitions of the "less," "sum," and "times" relations. Note that these relations are written with lowercase letters to distinguish them from the built-in relations. A fully reversible micro-Prolog factorial function can then be written by replacing the built-in functions with our declarative versions:

```
X has-factorial 1 if
    X is-less-than 1
X has-factorial Y if
    0 is-less-than X and
    X is-the-successor-of Z and
    Z has-factorial x and
    times (X x Y)
```

This definition now allows us not only to ask the forward question:

```
Which (x 3 has-factorial x)
```

and achieve the answer 6, but also to ask the backward question:

```
Which (x x has-factorial 6).
```

and achieve the answer 3.

As one might expect, the processing time needed to compute either of these answers is very slow. If you try it yourself, we recommend that you stick to the factorials of 0, 1, 2, and 3. Computing the factorial of 4 requires declaration of successor relationships up to 24 and takes several minutes to compute.

This performance problem, however, is partially due to the sequential nature of the systems on which micro-Prolog is currently implemented. When parallel machines are commonplace in the Fifth Generation, perhaps the promise of logic programming will make the Prolog twist a valuable technique rather than just an interesting exercise.

Further Reading

Clark, K.L., J.R. Ennals, and F.G. McCabe, 1982. *A micro-Prolog Primer.* Logic Programming Associates, London, England.

Clocksin, William F., and Christopher S. Mellish, 1981. *Programming in Prolog.* Springer-Verlag, Berlin, Heidelberg, New York.

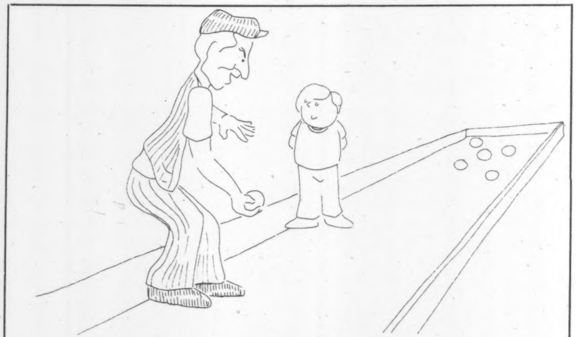
Digital Equipment Corporation, 1982. *VAX-11 Basic Language Reference Manual.* Digital Equipment Corporation, Maynard, Massachusetts.

Ennals, Richard, 1983. *Beginning micro-Prolog.* Ellis Horwood, Ltd., West Sussex, England.

Jensen, Kathleen, and Niklaus Wirth, 1974. *Pascal User Manual and Report.* Springer-Verlag, Berlin, Heidelberg, New York.

Kowalski, R.A., 1979. *Logic for Problem Solving.* Elsevier North Holland, Inc., New York, Amsterdam, Oxford.

Winston, Patrick Henry, and Berthold Klaus Horn, 1981. *Lisp.* Addison-Wesley Publishing Company, Reading, Massachusetts.



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APL

A Language of Pleasant Surprises

Vincent Stanford

APL, A Programming Language, is both very different from Basic and very powerful. After almost ten years of programming in Fortran, Basic, assembly language, and many structured variants of these languages, I decided to try it when it became available for my TRS-80.

I have been consistently amazed at the power of APL. APL is different, fundamentally different from the more commonly used languages. One of the main differences is that APL handles arrays as objects as well as individual entries. For example, consider how an array is moved to another array in Basic for two arrays X and Y (of two dimensions each):

```
10 for i=L1 to H1
20   for j=L2 to H2
30     Y(i,j)=X(i,j)
40   next j
50 next i
```

The corresponding construct in APL is given as:

```
Y←X
```

The reason for this difference is that Basic is what John Backus, the author of both Fortran and Algol (yes, the same man was responsible for both) calls a Von Neuman Language.

The Von Neuman computer, which is the prototype for most modern computers, consists of memory for storage and an accumulator and index registers for processing. To move a block of storage on such a machine, each memory location in the source block must be stored in the appropriate location of the destination block. To add two sets of numbers in two blocks of storage as in vector addition, an element from the first block must be loaded into the accumulator, the load instruction being indexed with the contents of an index register if a loop is being used, and an element from the second block must be added to the accumulator and the resultant sum storer at the desired location. In other words, almost all processing activities must be performed one number at a time and pass through the accumulator.

Higher level languages such as Fortran and its direct descendants, Algol, Basic, PL/1, and Pascal reflect this basic underlying computer architecture. In these languages, just as in assembly language, an algorithm must, ultimately, present a stream of numbers to an accumulator for processing: all the numbers must line up single file to pass through a bottleneck.

For example, consider the following program segments, both of which compute the total of the numbers contained in an array X:

```
Basic                        APL
10  T=0
20    for i=1 to n           T ← +/X
30      T=T+X(i)
40    next i
```

In the Basic algorithm, we are required to deal with each entry of X as an individual number using a "for" loop and an intermediate total for each step. In APL we can use two powerful array operators ← and /, and can treat that array X as an entity. In APL we "reduced X under addition," the reduction of an array X under an operator $\oplus$ being defined as:

$(\ldots (X_1 \oplus X_2) \oplus X_3) \oplus \ldots) \oplus X_n$

In the case of addition for $\oplus$ this is simply:

$X_1 + X_2 + \ldots + X_n$

This approach to programming allows the subordination of nonessential detail; it cuts down on unnecessary clutter. This can be seen by considering, in order, each discrete step required to implement the two algorithms.

Basic

1.) The variable used for the total must be given a name and initialized if it has been used before.

2.) A loop must be set up.

3.) An index must be chosen.

4.) A lower bound for the index must be chosen, in this case, 1.

5.) An upper bound, n, for the index must be chosen.

6.) A formula to compute the partial sums which lead to the desired grand total must be devised. This involves:

   a.) Two references to the variables containing the total.

   b.) A reference to the array X.

   c.) A reference to the array index i.

   d.) A special knowledge of Basic syntax to differentiate the occasions in which = means = (equals) and when it means ← (gets). Also, in high school algebra, T=T+x(i) implies that 0=X(i).

7.) The loop index must be incremented by the programmer using the "next" statement.

Together these discrete steps constitute roughly ten distinct possibilities for error. An important related point is that

---

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humans have, on average, the ability to hold seven plus or minus two items in short term memory. That means that even a small segment of code can exceed our ability to perceive directly the function being performed.

By contrast, consider the steps below:

APL

1.) The variable to be summed must be named.
2.) The reduction operator must be invoked.
3.) The + must be used to indicate reduction under addition.

In APL, only three discrete items must be kept in mind to perform the summation. No loop and no index are needed.

Another, less trivial programming example shows that the difference in labor can be even greater than that described above. Programs which sort an array called X are shown in Basic and APL in Figure 1. A bubble sort is used in the Basic example.

Space and patience prohibit a careful analysis of all the elements required to do the sort in Basic. In APL, by contrast, we know only that ↑ is an array operator which produces a "sort vector" which is then used as a kind of a generalized subscript to unscramble X. Yes, in APL arrays may be used as subscripts. For example:

X [3 4 5] is equal to 22 67 9

if X is the array sorted in the example above.

So APL is based on operators which work on arrays rather than on numbers. Another thing that constantly contributes to the endless string of pleasant surprises about APL is that these operators usually have more than one meaning. This combines with the completely dynamic nature of APL variables to form the basis for a truly delightful computer language.

For example, suppose that the following statement were executed (X need not be declared in advance):

X ← 100 99 98 97 96 95 94 93 92 91

Then X [5 6 7] takes the values 96 95 94, which are just the middle five through seven numbers of the X array. Next, suppose that the following statement was executed:

X ← 'The Middle Characters'

X has now changed to a character variable from a numeric one,

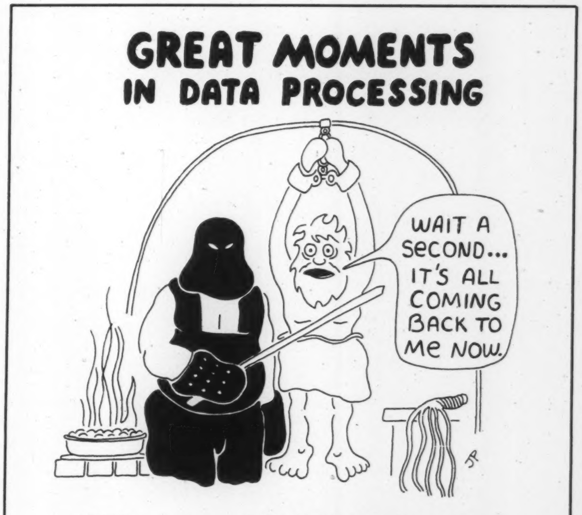
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Figure 1.

```
Basic                                                    APL

10 REM  load the data array
20 n=7: data 11,22,22,67,9,81,3                          X ←  11 22 22 67
30 DIM X(n)                                              9 81 3
40 for i=1 to n
50   read X(i)
60 next i
70 REM sort the array
80 for i=1 to n-1                                       X ← X[ ↑ X]
90   k=n-i+1
100  for j=2 to k
110    If not (X(j)<X(j-1)) then go to 150
120       t=X(j)
130       X(j)=X(j-1)
140       X(j-1)=t
150 REM end if
160  next j
170 next i
180 REM output the results                          X
190 for i=1 to n
200  print X(i);"  "'
210 next i
220 print
230 stop
```

and from 10 to 21 elements. But the expression X [5 6 7] still has a valid meaning:

X [5 6 7] has the value Mid

So, the index operator [ ] serves not only the role of the Basic subscript but also that of the substring operator MID$. Everything seems to work that way, which makes it an enjoyable language to play with.

Uses Of APL

APL is especially strong in the area of statistical computation. This makes it an excellent aid for statistics course work and hard science laboratory work. Many problems which require either long sequences of hard calculations or cumbersome Basic programs can be accomplished with a few symbols in APL. For example, a function to compute the mean of a vector X which is defined mathematically as:

$$\frac{1}{m}\sum_{i=1}^{m} X_i$$

can be defined in APL80 as follows:

```
)def Mean.of.data←mean data
   1: Mean.of.data←(+/data)-ρ data
```

Several features of this function will be new to Basic programmers. The long and self-explanatory name Mean.of.data is one. APL80 names may be up to 2 characters in length. The shape operator ρ (often called either *rho* or *shape*) tells how many elements are in data at the current time. This can change at the option of the programmer in APL. Similarly the variance of a vector X is defined mathematically as:

$$\frac{1}{(m-1)}\sum_{i=1}^{m}(X_i-\overline{X})^2$$

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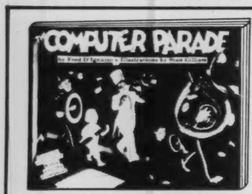

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Where $\overline{X}$ is the mean of X. An APL80 function to compute the variance could be as follows:

```
)def Variance.of.X←Var X
   1: Variance.of.X←(+/(X-mean X)*2)÷((ρX)-1)
```

Note the structural similarity of statement 1 of Var to the original formula. No loops were needed. Often in APL programs operators such as reduce (/), which handle arrays, take the place of loops. Note also that we were able to make immediate use of the mean function defined earlier.

The Pearson correlation coefficient computed from two vectors X and Y is defined mathematically as:

$$\frac{\sum_{i=1}^{m} X_i\ Y_i - m\overline{X}\overline{Y}}{\sqrt{\left(\sum_{i=1}^{m} X_i^2 - m\overline{X}^2\right)\left(\sum_{i=1}^{m} Y_i^2 - m\overline{Y}^2\right)}}$$

This can be implemented in APL80 as:

```
)def R ← X corr Y
   1: X ← X-mean X
   2: Y ← Y-mean Y
   3: R ← (+/X*2)x(+/Y*2)
   4: R ← (+/X*Y) ÷ R*.5
```

Again, this is simply implemented in APL with only a few symbols and array operators.

A function which produces a histogram of a set of data points can be simply defined as follows in APL80:

```
)def plot ← X hist grid; cell; freqs; max.freq
   1: cell ← +/X°.>grid
   2: freqs ← +/ιρgrid)°.=cell
   3: max.freq ← Γ/freqs
   4: plot ← '*'[1+(ιmax.freq)°.≥freqs))]
```

This routine is complicated enough so that a discussion of how to read APL is in order. APL is best read with the aid of the APL interpreter. Especially at first, the language symbols look like hieroglyphs and are not easy to comprehend. A good way to learn is to make up test values for the variables used and to execute the statements piece by piece and examine the intermediate results in the immediate mode of the interpreter to explain and verify what has been written in the function.

First, though, we should take a look at the operators used. Remembering that APL executes statements from right to left, the first operator we encounter in the function is the ° . . This is called the outer product, sometimes pronounced "jot dot." It requires two variables and diadic operator as its operands. Roughly speaking, it forms all possible pairs products of the elements of the two variables under the specified operator. This is simpler than it sounds. Let's make up some data for the histogram variables:

```
grid ← 0 100 200 300 400 500
```

and

```
X ← ?10ρ600
X
   545 297 364 205 140 398 321 80 438 27
```

The ? command will give us ten random numbers between 1 and 600. The expression x°.>grid is now defined as shown in Table 1. Notice that 545, the first entry, is greater than 500, so the row in the outer product corresponding to it contains five ones. This means that it is in the "greater than 500" class in the histogram. The next one down, 297, corresponds to a row with three ones or the "greater than 200 but less than or equal to 300" category.

Table 1.

		grid					
	>	0	100	200	300	400	500
	545	1	1	1	1	1	1
	297	1	1	1	0	0	0
	364	1	1	1	1	0	0
	205	1	1	1	0	0	0
X	140	1	1	0	0	0	0
	398	1	1	1	1	0	0
	321	1	1	1	1	0	0
	80	1	0	0	0	0	0
	438	1	1	1	1	1	0
	27	1	0	0	0	0	0

If there were only some way to add up the ones in each row, we would have the histogram class for each of the numbers in X. Plus reduction (+/) added up the numbers in one row, which was a vector. In APL most operators generalize to two and higher dimensions of arrays. A natural, and in APL usually successful, impulse would be to try the expression +/x°>grid and see what results.

```
cell ← +/X°.>grid
cell
   6 3 4 3 2 4 4 1 5 1
```

A quick check of Table 1 shows that plus reduction summed up the two dimensional array X°.>grid in a row major order which results in the class of each data point. This array of classes is assigned to the variable name "cell" in the histogram algorithm.

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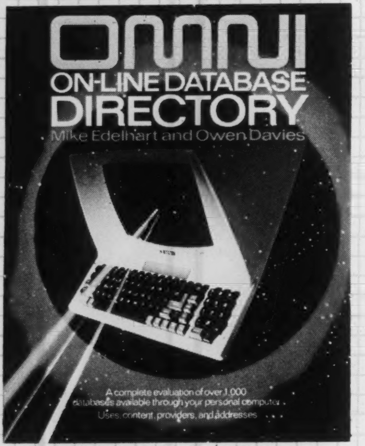
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APL, continued...

The next line uses another jot dot, this time a jot dot of =. But, what is the meaning of ιρgrid? Ask your APL interpreter:

```
 ρgrid
   6
 ιρgrid
   1 2 3 4 5 6
```

ι (iota or "index") of N is a vector containing the integers 1 though N. As before (ιρgrid)°.=cell is defined as shown in Table 2, and APL tells us:

```
 □ ← freqs ← +/(ιρgrid)°.=cell
     2 1 2 3 1 1
```

Table 2.

		cell									
	=	6	3	4	3	2	4	4	1	5	1
grid	1	0	0	0	0	0	0	0	1	0	1
	2	0	0	0	0	1	0	0	0	0	0
	3	0	1	0	1	0	0	0	0	0	0
	4	0	0	1	0	0	1	1	0	0	0
	5	0	0	0	0	0	0	0	0	1	0
	6	1	0	0	0	0	0	0	0	0	0

which are exactly the frequency counts for each class given by grid. This vector is assigned to freq in the function for subsequent use.

The next line shows another generalizaton of an operator. Plus reduction has just been used to good effect; now max reduction is also used. The operator Γ chooses the larger element of a pair. Γ/array chooses the maximum element of an array.

Line four of the histogram function actually creates the plot of the frequency counts. As above, the way it accomplishes this can be understood by starting at the righthand side of the expression and breaking it down into small pieces. This proceeds as follows:

```
 Max.freq
    6
 ι Max.freq
     1 2 3 4 5 6
 freqs°.≥ Max.freq
```

Table 3.

		Max. freq					
	≥	1	2	3	4	5	6
freqs	2	1	1	0	0	0	0
	1	1	0	0	0	0	0
	2	1	1	0	0	0	0
	3	1	1	1	0	0	0
	1	1	0	0	0	0	0
	1	1	0	0	0	0	0

Table 3 shows the result of this operation. Since zero is not a valid subscript in APL80, 1 is added to (freqs°.≥ Max.freq) to transform the zeroes and ones to ones and twos respectively. These are used as subscripts to the character array ' *' to convert the ones and twos to blanks and asterisks. The expression in the final line of the function results in:

```
 ' *' [1+((ιMax.freq)°.≥freqs)]

       *
   *  **
   ******
```

Many other basic statistical computations can be done with very small APL80 functions which are quickly and easily written. I have found the orderliness and generality of APL a continuing source of surprises. Always pleasant surprises—APL.

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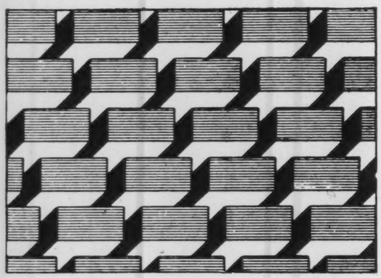
Assembly Language

A Coward's Introduction

Charles Leedham

Assembly language programming can accomplish miracles, but it been made to seem almost as mysterious as the Aztec priesthood. It is a fair bet that the majority of personal computer owners are fairly well versed in Basic programming, but very few have ventured into the mysterious realm of assembly language. And more's the pity, as assembly can do things that Basic never dreamed of.

One of the nice things about Basic is that you can see results right away. Type in ?"Hello", press the ENTER key, and the machine nicely prints out HELLO. It is encouraging, and you go on from there. Assembly, on the other hand, has always been presented as a massive task, requiring the mastery of mystical registers, and indirect register addressing, and things that boggle the mind of the lowly Basic programmer. If only you could do something simple with assembly that would show results right away.



That is what this article is all about. You *can* start off slowly in assembly, and do some nice small things with it. But seeing is believing, and the way to see it is to type into your computer the relatively short Basic program in Listing 1. You will soon see what remarkable things assembly can do in the way of instantaneous screen graphics. Along the way you can pick up a few reassuring facts about assembly if you want to, but you don't even need to do that.

Doing It In Basic

Now, let's pose this problem: you have written a nice little program and you would like to have on the screen the outlines of five playing cards, the values to be put in by the rest of the program. You could draw the card outline with the agonizingly slow *set* method—you may even have in your cassette collection a commercial program or two that does exactly that.

Or, you may be a step further along, and have worked to graphics via PEEKS and POKES which enable you to draw things on the screen up to six times faster than you could by setting X and Y. In the TRS-80 card outline program in Listing 1, the figures are drawn about 2 1/2 times faster than they would be using SET.

Take a look at Listing 1. Lines 50 through 100 put the card outlines on the screen using the SET command. This is really quite simple, but it takes what seems like forever as the lines crawl slowly across and down the screen. Then lines 130 through 160 do essentially the same outlines by POKEing graphics symbols direcly into the screen locations you have read about in the manuals.

This method is similar to assembly, because by POKEing, you are *addressing* the 1024 little memory cell on the screen more or less directly. But because you are writing Basic, there is an interpreter in the way to slow things down.

In essence, the interpreter sees the word POKE and stops for a while to look it up in its electronic "Basic to Binary" dictionary, discovers that you want a certain graphics character to be put into the specified location, and only then does it. It is the looking up that takes over 99% of the time. Actually putting the symbol on the screen once it knows what you want takes something on the order of two microseconds.

The Same Thing In Assembly

Now we get to assembly itself, or at least the portion of Listing 1 which accomplishes an assembly (more properly, machine language) presentation of the card outlines. To do this part, I wrote a very small assembly program with an Editor/Assembler utility program. See the *source code* in Listing 2. The utility program *assembled* the source code directly into numerical instructions which are the native language of the Z80. Those numerical instructions are the numbers listed in the DATA statements from lines 240 through 290.

How does the Basic program execute machine language instructions?

How does the Basic program execute machine language instructions? First, the program tells the Z80 that there is a machine language program present in high memory, and specifically that it starts at memory location 32000. That is what line 20 is all about.

Memory locations 16526 and 16527 in the TRS-80 contain the address of still another location at which a machine language program begins, provided you have put the location into those two cells, which is what POKEing 0 into 16526 and 125 into 16527 does. If you want to know more about this process, look at Section 8 of the Level II manual,

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under USR(x), a section which is somewhat confusingly written, but will tell you more than we have space for here.

The number 32000 in the decimal number system is 7D00H in hexadecimal, but don't let your eyes start glazing over just yet. There will be as little talk about hexadecimal numbers as possible. Just accept the fact that for reasons best known to its designers, the first memory location, 16526, contains the *least significant byte* of 7D00H, and that byte, the last two figures, is zero.

The second location, 16527, contains the *most significant byte*, 7DH. Confusing as it is, and despite the fact that the machine works with hexadecimal numbers and binary bits, you must POKE things into the memory locations in the decimal equivalents of the hexadecimal bytes. So the hexadecimal 7DH which must go into 16527 must go in as 125.

Here, by the way, Radio Shack's manual makes a truly staggering error, telling you that to POKE 7DH, you use the figure 208. 208 isn't 7DH; 125 is.

Hex To Decimal

As an aside, you convert a two-digit hexadecimal number to decimal by multiplying the first digit by 16 and then adding the second digit, remembering that the letters A through F represent 10 through 15. Seven times 16 is 112 and you add 13 (what D stands for), and you get 125.

Listing 1.

```
10   CLS
20   POKE16526,0:POKE16527,125
30   FORA=32000TO32057:READB:POKEA,B:NEXTA
40   PRINT@793,"SET GRAPHICS":GOSUB210
50   Y=14:FORX=5TO120
60   SET(X,Y):SET(X,Y+16):NEXTX
70   X=5:FORZ=1TO6
80   FORY=15TO29
90   SET(X,Y)
100  NEXTY:X=X+23:NEXTZ
110  GOSUB220
120  PRINT@793,"POKE GRAPHICS":GOSUB210
130  FORX=15618TO15678:POKEX,176:POKEX+384,131:NEXTX
140  Z=15682:FORA=1TO5
150  FORX=ZTOZ+48STEP12:POKEX,149:NEXT:POKEZ+60,170
160  Z=Z+64:NEXTA
170  GOSUB220
180  PRINT@790,"ASSEMBLY GRAPHICS":GOSUB210
190  X=USR(N)
200  GOSUB220:GOTO40
210  FORX=1TO300:NEXT:RETURN
220  PRINT@914,"PRESS 'ENTER' TO CONTINUE";
230  INPUTA$:CLS:GOSUB210:RETURN
240  DATA 33,2,61,17,3,61,1,60,0,54,176,237,176
250  DATA 33,130,62,17,131,62,1,60,0,54,131,237,176
260  DATA 14,5,33,66,61,205,39,125,13,194,31,125,201
270  DATA 17,12,0,6,5,54,149
280  DATA 25,5,194,44,125,54,170
290  DATA 17,4,0,25,201
```

Now, to get back on track, line 20 tells the machine that a machine language program begins at location 32000 and that when it later gets an instruction to jump to a machine language routine, that is where to look for the beginning. Line 190 gives that instruction.

Don't be puzzled because I didn't use the recommended ?USR(N) or another common command, ?USR(0). If you do it that way, it will print an N or a 0 in the upper lefthand corner of the screen for reasons which quite escape me. But the version in line 190 doesn't.

The 58 numbers in the DATA lines are direct numerical instructions to the Z80 which the Editor/Assembler provided along with the addresses of the memory locations from 32000 through 32057 in which to put them. The first action line of the *assembled* program (after line 00100, which tells it where to start) is 00110, and it looks like this on the screen after assembly or printed out on your printer:

7D00 21023D 00110 START LD HL,15618

This tells you that starting at 7D00 (32000 in decimal), there was a three-byte instruction. Every two digits in the number that follows represent one byte. So I converted the 21H to 33, the 02H to 2, and the 3DH to 61.

As the first three numbers in the DATA lines, they are POKEd into memory locations 32000 through 32002 by line 30, which is exactly what a pure machine language program would do. From then on, I did the same thing for every memory location and instruction. The DATA numbers were the result, and line 30 reads the DATA numbers one by one and POKEs them one by one into all the memory locations between 32000 and 32057.

Once the computer hits line 190 and sees that it is to go to a machine language routine, it immediately looks at locations 16526 and 16527, finds the 32000 address, and jumps there to see what is happening—all in a few microseconds.

Then, at 32000, it finds the number 33. In an instruction location, the number 33 tells the Z80 to load a register pair called HL with the number that follows in the next two memory locations, in this case 32001 and 32002. So it moves swiftly on, finds the overall number 15618, and obediently puts that number into the two memory locations which make up the special section called the HL register pair.

In listing the source code, incidentally, I have used all decimal numbers in the instructions, just to make it easier to look back and forth between the assembly listing and the POKE part of the Basic program, which may give you

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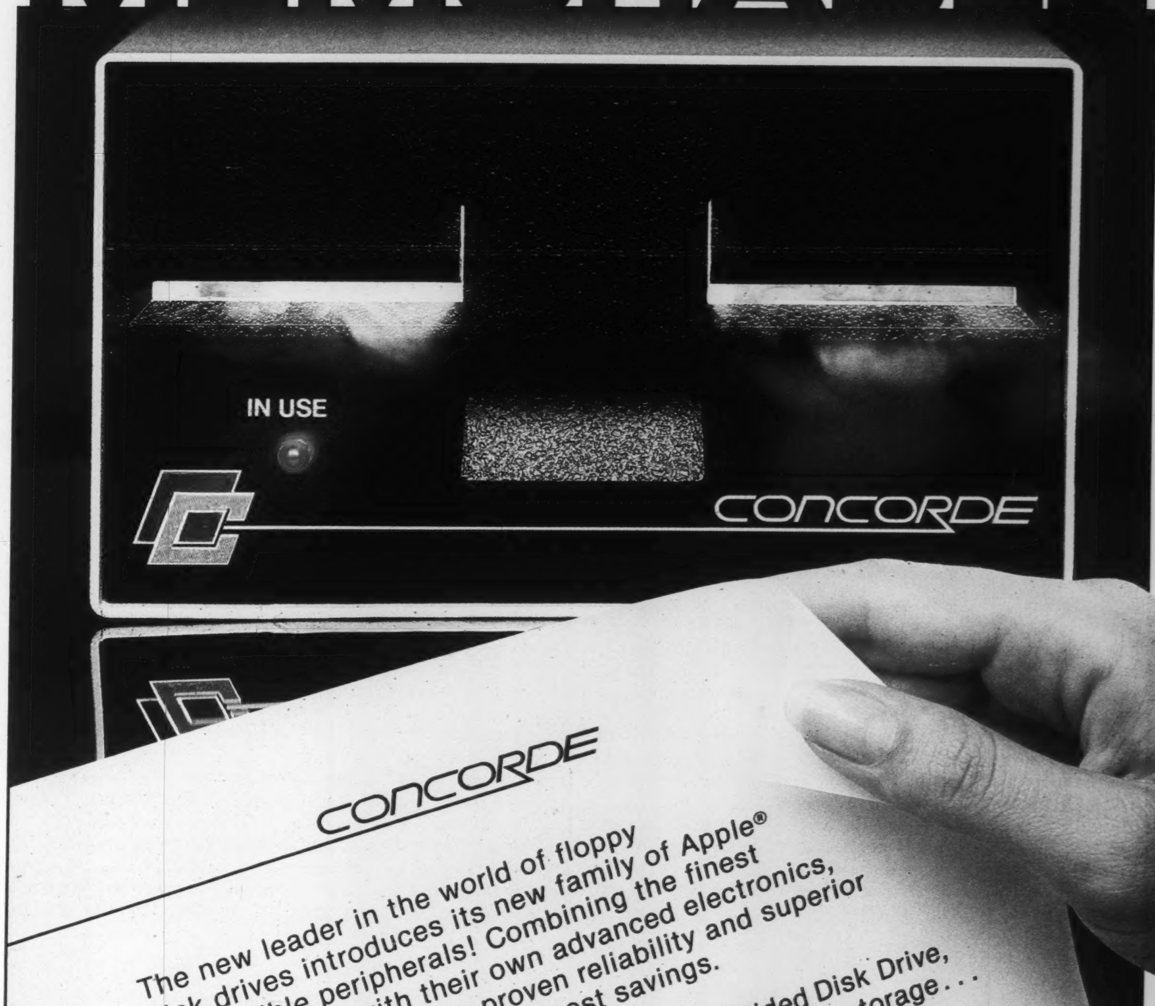

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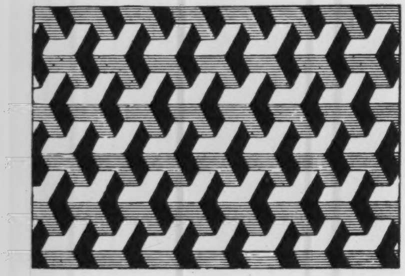
some clues as to what is going on in the assembly section. Normally, putting decimal numbers in assembly source code instructions is considered bad form, but the machine can handle it nicely.

What all of this has done, essentially, is to tell the Z80 to start with memory location 15618 (a screen location) and do whatever comes next.

What comes next is contained in lines 00120 through 00150 in Listing 2, the last of which has the simple instruction LDIR. If you have done some graphics using POKEs, you know that the upper lefthand corner of the screen is memory location 15360 and the lower right is 16383.



The five assembly lines tell the Z80 to start with location 15618 and fill it with a graphics character—the one represented by TRS-80 graphics code 176—and then do the same with the next one, and so on 60 times, which is what the 60 in the instruction LD BC,60 means.

The LDIR (along with what is in register pair BC) is a nice automatic loop not unlike FOR X = 1 TO 60. Those five lines, in just 11 bytes, tell the computer to draw a 60-unit horizontal line across the screen, starting at 15618.

The next section tells it to do the same thing starting at 16002, and the remainder tells it how to draw the six vertical lines. As you can see, assembly is an economical way to program, as well as being extremely fast when it comes to graphics.

If you type in the Basic program in Listing 1 and run it, you will see the card outlines drawn first using the SET command, which really takes only a few seconds, but seems quite slow. Next it draws the same lines using POKEs—faster, but still slow. Then, the outlines are simply popped onto the screen by the assembly section; the card outlines appear on the screen in something under one-thousandth of a second.

What Next?

Now, what does this do for you, a non-assembly language programmer? It shows you not only the miracle of machine language graphics, but how they can be made to work quite simply. And that they can be included in a Basic program with just a few DATA statements.

One note of caution: If you type in the Basic program in Listing 1, dump it on a spare bit of tape before you try to run it. If you have made a mistake of so much as a single digit in the DATA statements, you may find yourself with a blank screen, nothing happening, and no way to recover without turning the computer off and starting all over. There are no error messages in machine language. One wrong digit in a machine language instruction can send the program racing off doing all sorts of unintended things, happily loading memory locations with interesting things that aren't meant to be there, including numbers which disable the BREAK key and even the Reset button.

In the DATA statements, the numbers are put into the lines the way they are not just at random, but to give you an opportunity to play with assembly graphics.

Line 240 contains the numerical instructions equivalent to the first five lines, up to the LDIR, of the assembly program in Listing 2. The last two numbers of Line 230 are the numerical instructions which tell the Z80 to do its LDIR number. The number before that, 176, is the code number for the graphics figure which is the lower two little pixels of the 2 x 3 graphics block.

Once you have the program running and have finished marvelling at the speed of machine language graphics, you can begin playing with it a bit.

Experimenting With The Program

Once you have the program running and have finished marvelling at the screen machine language graphics, you can begin playing with it a bit. Graphics block code numbers run from 129 through 191, and each one is a little dif-

Listing 2.

```
00100            ORG     32000
00110  START     LD      HL,15618
00120            LD      DE,15619
00130            LD      BC,60
00140            LD      (HL),176
00150            LDIR
00160            LD      HL,16002
00170            LD      DE,16003
00180            LD      BC,60
00190            LD      (HL),131
00200            LDIR
00210            LD      C,5
00220            LD      HL,15682
00230  LINES     CALL    VERTS
00240            DEC     C
00250            JP      NZ,LINES
00260            RET
00270  VERTS     LD      DE,12
00280            LD      B,5
00290  LOOP      LD      (HL),149
00300            ADD     HL,DE
00310            DEC     B
00320            JP      NZ,LOOP
00330            LD      (HL),170
00340            LD      DE,4
00350            ADD     HL,DE
00360            RET
00370            END
```

ferent. Use the editing mode and, for example, put 144 in the third-from-last position instead of 176, and you will get a dotted line along the top of the figure. Or put in 185 and see what happens. Try the same thing with line 250, substituting another graphics code number for 131.

You can even experiment, *very carefully*, with the 60 in lines 240 and 250. Put in a lower number and the horizontal lines will be shorter. Try a longer number and you will get stripes. But don't try to put a number in larger than 255, the maximum that can be POKEd into that one memory cell.

Where To Go From Here

All this fun is well and good, and the idea is to show you that assembly language isn't all that mystical—at least not when you have the instruction numbers sitting there in DATA statements. But what if you get enthusiastic about instantaneous assembly graphics and want something other than a card outline?

You might be lucky enough to have a friend who programs in assembly who will put together a small program for you with his Editor/Assembler and then let you work out the DATA numbers to POKE in.

Or, you might want to get serious about learning assembly. Get an Editor/Assembler and a good book on learning assembly, and begin, in easy stages. Type in source code, Listing 2. Find out just how and why it works. Enter a few of the other small and interesting source code listings you have seen in this and other magazines but passed by because they were written in assembly language. Get yourself a good screen location diagram pad (Radio Shack sells them) and experiment with loading different graphics characters into screen memory locations to make any figure you want.

Most important, however, get an Editor/Assembler that allows you to "assemble in memory" so you can write a little experimental program, assemble it directly into memory, switch to Basic, and run the program. If it doesn't work right, you can switch right back to assembler, list the source code on the screen or to your printer, and find out what went wrong. If you can't do "in memory" assembling, it is really tedious to make tapes, dump, re-load, try out, then re-load the assembler.

Microsoft's Editor/Assembler/Plus is a good one but there may be others on the market that do the same work. Don't be afraid of assembly. You may never be an accomplished assembly programmer—it takes a long time and very hard work—but then again you just might. And with even a little knowledge of assembly, you can do some really nice things with your Basic programs. ☐

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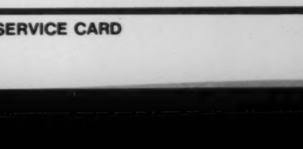

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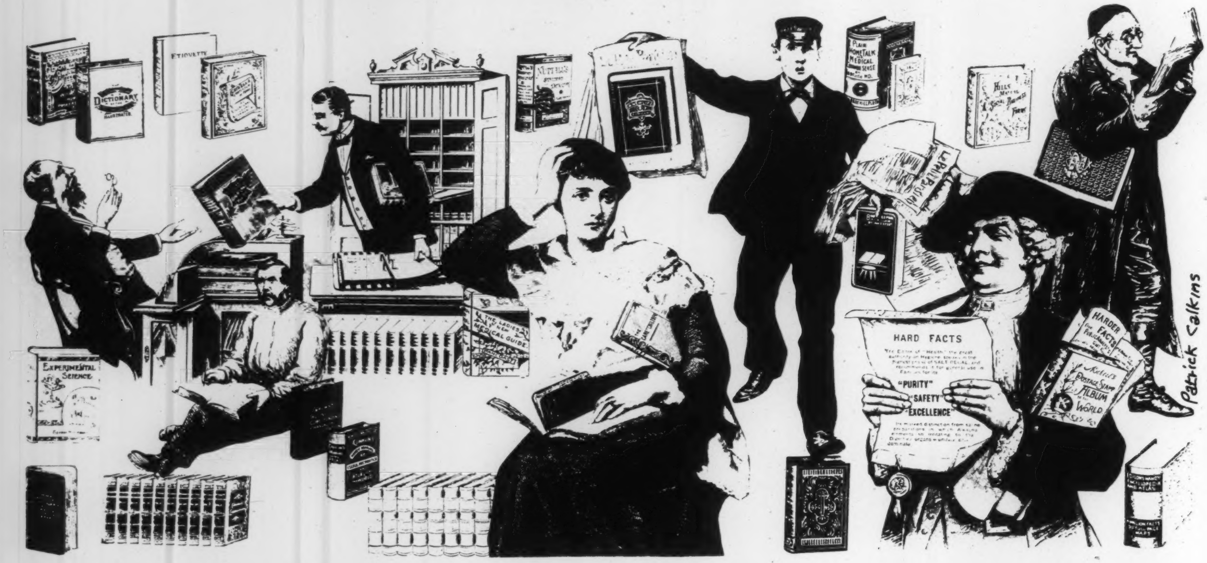

Thomas M. Paikeday

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One of the many occupations that microelectronics has revolutionized is the compilation of reference works which require the collection and organization of vast amounts of data gathered from innumerable sources. Traditionally, the editors of catalogs, indexes, directories, thesauruses, encyclopedias, and dictionaries have relied on the card file as their main repository of information.

As is well known, dictionaries are the most widely used of reference books, second only to the Bible in total word sales. They are also the most specialized and complicated of all, requiring data files that consist of millions of 4" x 6" slips called citations illustrating the meanings and usages of words. The citation file of a traditional dictionary publisher such as Oxford University Press or the Merriam-Webster Company in Springfield, MA, is as large as the card catalogs of the largest libraries in the world.

Until a few years ago, computerizing a data file of such a size was prohibitive even for the most prosperous of book publishers. The microelectronic revolution, however, has made it affordable for even the private lexicographer.

One of the latest dictionaries on the American market today is *The New York Times Everyday Dictionary*, published in the fall of 1982 by Times Books. In the late 1970's when the *Times* dictionary was commissioned, microcomputers were just making their debut. By the time the dictionary was ready for publication, a complete microcomputer system for the collection and analysis of dictionary data was in service—a world's first for a publication associated with one of the world's greatest newspapers.

Until a few years ago, computerizing a data file of such a size was prohibitive even for the most prosperous of book publishers.

This article outlines the various functions of that microcomputer system, the Lexicon program, as it has been called. It should prove of interest not only to lexicographers and linguists but to a wide spectrum of authors, editors, indexers, and word lovers—practically everyone concerned with any type of English composition or language analysis.

Except for the file creation routine which is written in Basic, the rest of Lexicon is in machine code, in two separate modules, each taking up less than 5K of memory. Most routines are executed by the computer at an average reading speed of about 25,000 words a minute. This is using a computer with only 48K of internal memory working at about 2MHz clock speed like the first machine we used on our project, a TRS-80 Model I. With larger and faster machines using hard disks, the speed is considerably higher.

Preparing The Bed

A word processing program such as *Scripsit* working with 48K of memory can handle online files of only up to 5000 words—too small for a dictionary data file or even to hold a book of some size as, say, *Joy of Cooking* or *The Thorn Birds* (250,000 words). Lexicon is designed for book-length files, in fact, for files of indefinite length.

The first routine of Lexicon creates a continuous "mainfile" on the disk drives connected to the computer. The mainfile is continous in the sense that when a global search is commanded, say for a word count of the entire online file, the computer starts with Drive 0 and reads to the end of the last drive connected to it. An uninterrupted search of one megabyte of data (about 200,000 words)

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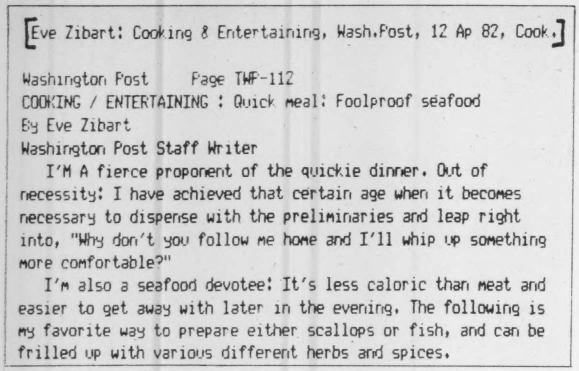

```
[Eve Zibart: Cooking & Entertaining, Wash.Post, 12 Ap 82, Cook.]

Washington Post     Page TWP-112
COOKING / ENTERTAINING : Quick meal: Foolproof seafood
By Eve Zibart
Washington Post Staff Writer
   I'M A fierce proponent of the quickie dinner. Out of
necessity: I have achieved that certain age when it becomes
necessary to dispense with the preliminaries and leap right
into, "Why don't you follow me home and I'll whip up something
more comfortable?"
   I'm also a seafood devotee: It's less caloric than meat and
easier to get away with later in the evening. The following is
my favorite way to prepare either scallops or fish, and can be
frilled up with various different herbs and spices.
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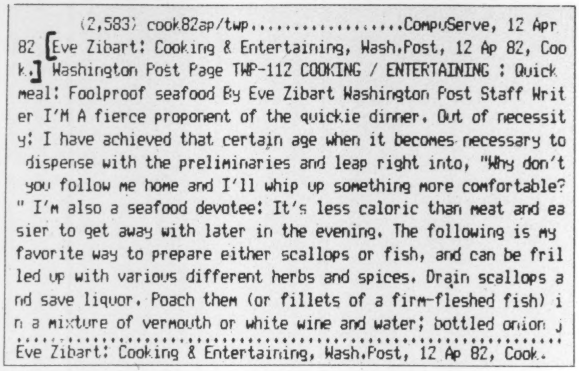
Figure 1a. Text ready for input into mainfile with inserted line within boundary markers.



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82 [Eve Zibart: Cooking & Entertaining, Wash.Post, 12 Ap 82, Coo
k.] Washington Post Page TWP-112 COOKING / ENTERTAINING : Quick
meal: Foolproof seafood By Eve Zibart Washington Post Staff Writ
er I'M A fierce proponent of the quickie dinner. Out of necessit
y: I have achieved that certain age when it becomes necessary to
 dispense with the preliminaries and leap right into, "Why don't
 you follow me home and I'll whip up something more comfortable?
" I'm also a seafood devotee: It's less caloric than meat and ea
sier to get away with later in the evening. The following is my
favorite way to prepare either scallops or fish, and can be fril
led up with various different herbs and spices. Drain scallops a
nd save liquor. Poach them (or fillets of a firm-fleshed fish) i
n a mixture of vermouth or white wine and water; bottled onion j
................................................................
Eve Zibart: Cooking & Entertaining, Wash.Post, 12 Ap 82, Cook.
```

Figure 1b. Text is loaded into mainfile with all word spaces reduced to one each. Inserted lines are displayed at the bottom of the screen.

takes from eight seconds to eight minutes, depending upon whether the information sought is at the beginning or end of the mainfile.

The creation of a mainfile itself takes about ten minutes to go through four 40-track double density drives—the floppy system we found most practical for everyday use. Once a set of disks is thus prepared, they can be used as masters to copy from relatively quickly for making more mainfiles for storage and analysis of different texts.

Texts are typed in using a word processing program or received from other databases such as CompuServe and online newspapers using a terminal program included in Lexicon.

Lex With Ancients and Moderns

When we work on books that have already been typeset, instead of keying in the whole text, we buy the magnetic tapes used for their composition. The major works of world literature, ancient and modern, in languages from Chinese to Greek and Latin to Tibetan and Turkish, are available in machine readable form to scholars at nominal cost from the computing centers of universities such as Oxford and Cambridge. All such tapes can be put on the tape drive of a mainframe computer and converted for use on your micro through a hardwired connection to the RS-232 interface.

Since text entered in a mainfile cannot be changed after loading, all editing is done before input. Again the word processing program comes in handy for routine editing, but only Lexicon can be used for inserting bibliographies, footnotes, etc. in the texts going into a mainfile.

Insertions are made by calling up the desired file on the screen from its disk storage, typing in the new material at the appropriate places in the text, and entering it after inserting boundary markers before and after it. Insertions must not be longer than one line each, or 64 characters and spaces. Such inserted lines are displayed by the computer at the bottom of the screen without being read as part of the online text (Figure 1).

Once your texts have been edited, they may be loaded from the buffer into mainfile one after another with a single keystroke.

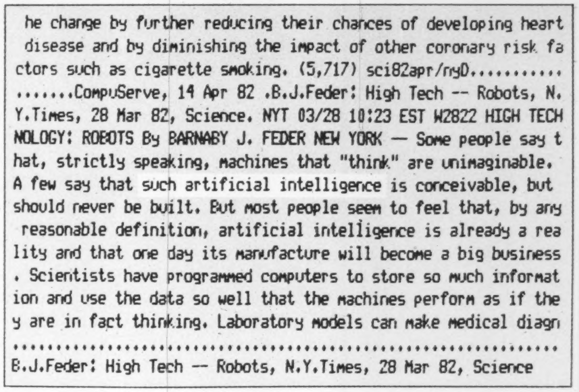
The Lex Drive Or Seven On The Floor

Using the first of seven retrieval functions of Lexicon, any string of characters and spaces to a maximum length of 64 (including the command word FIND) may be searched for in the mainfile (Figure 2). Variations in the spacing used before and after the input string yield four possible variations on what is retrieved. In the following commands # stands for space:

1. FIND # # (string) # (ENTER)
2. FIND # # (string) (ENTER)
3. FIND # (string) # (ENTER)
4. FIND # (string) (ENTER)

This is designed chiefly to get out dictionary data based on word formations. Thus, if you wanted *form*, *formal*, *formed*, *former*, *formula*, and *form and substance*, you would key in "Form" us-

"Somehow, I've lost my thirst for scientific knowledge!"



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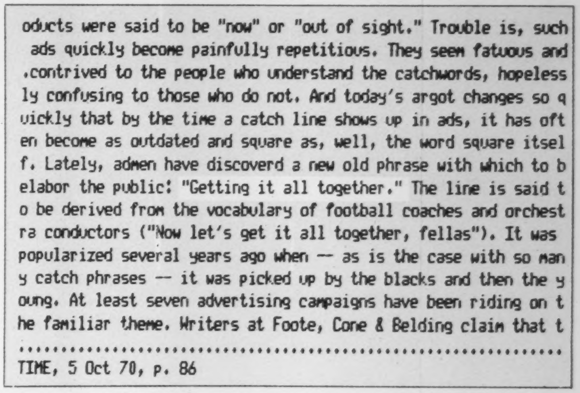
 he change by further reducing their chances of developing heart
 disease and by diminishing the impact of other coronary risk fa
ctors such as cigarette smoking. (5,717) sci82apr/nyD...........
.......CompuServe, 14 Apr 82 .B.J.Feder: High Tech -- Robots, N.
Y.Times, 28 Mar 82, Science. NYT 03/28 10:23 EST W2822 HIGH TECH
NOLOGY: ROBOTS By BARNABY J. FEDER NEW YORK — Some people say t
hat, strictly speaking, machines that "think" are unimaginable.
A few say that such artificial intelligence is conceivable, but
should never be built. But most people seem to feel that, by any
 reasonable definition, artificial intelligence is already a rea
lity and that one day its manufacture will become a big business
. Scientists have programmed computers to store so much informat
ion and use the data so well that the machines perform as if the
y are in fact thinking. Laboratory models can make medical diagn
................................................................
B.J.Feder: High Tech -- Robots, N.Y.Times, 28 Mar 82, Science
```

Figure 2. FIND *"artificial intelligence" was the command used to have this portion of text displayed. The key word appears flashing in the center of the screen.*



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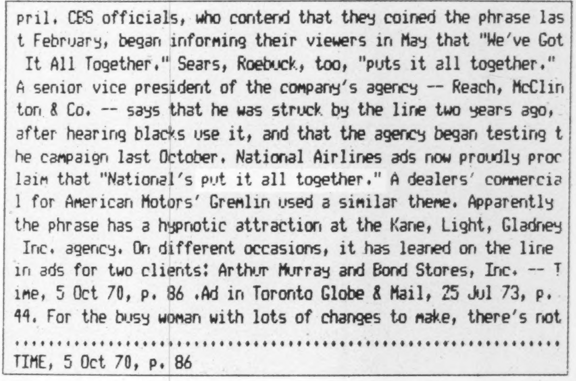
 oducts were said to be "now" or "out of sight." Trouble is, such
  ads quickly become painfully repetitious. They seem fatuous and
 .contrived to the people who understand the catchwords, hopeless
 ly confusing to those who do not. And today's argot changes so q
 uickly that by the time a catch line shows up in ads, it has oft
 en become as outdated and square as, well, the word square itsel
 f. Lately, admen have discoverd a new old phrase with which to b
 elabor the public: "Getting it all together." The line is said t
 o be derived from the vocabulary of football coaches and orchest
 ra conductors ("Now let's get it all together, fellas"). It was
 popularized several years ago when -- as is the case with so man
 y catch phrases -- it was picked up by the blacks and then the y
 oung. At least seven advertising campaigns have been riding on t
 he familiar theme. Writers at Foote, Cone & Belding claim that t
................................................................
TIME, 5 Oct 70, p. 86
```

Figure 3a. The PHRASE *command searches out variable strings defined by the initial letter(s) and final word of the string. Thus "g . . . together" searched out this portion of text with the phrase* Getting it all together.



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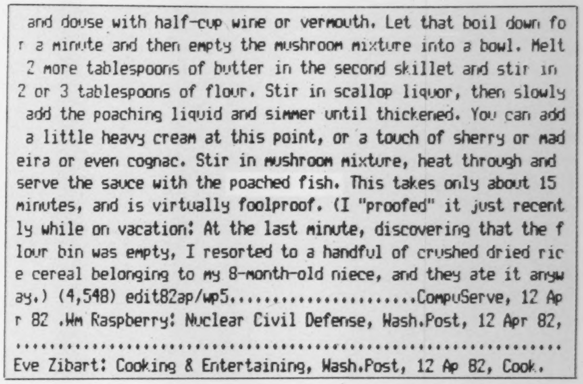
pril. CBS officials, who contend that they coined the phrase las
t February, began informing their viewers in May that "We've Got
 It All Together." Sears, Roebuck, too, "puts it all together."
A senior vice president of the company's agency -- Reach, McClin
ton & Co. -- says that he was struck by the line two years ago,
after hearing blacks use it, and that the agency began testing t
he campaign last October. National Airlines ads now proudly proc
laim that "National's put it all together." A dealers' commercia
l for American Motors' Gremlin used a similar theme. Apparently
the phrase has a hypnotic attraction at the Kane, Light, Gladney
 Inc. agency. On different occasions, it has leaned on the line
in ads for two clients: Arthur Murray and Bond Stores, Inc. -- T
ime, 5 Oct 70, p. 86 .Ad in Toronto Globe & Mail, 25 Jul 73, p.
44. For the busy woman with lots of changes to make, there's not
................................................................
TIME, 5 Oct 70, p. 86
```

Figure 3b. The PHRASE *command specifying "p . . . together" searched out this portion of text with the phrase* put it all together.



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 and douse with half-cup wine or vermouth. Let that boil down fo
r a minute and then empty the mushroom mixture into a bowl. Melt
 2 more tablespoons of butter in the second skillet and stir in
2 or 3 tablespoons of flour. Stir in scallop liquor, then slowly
 add the poaching liquid and simmer until thickened. You can add
 a little heavy cream at this point, or a touch of sherry or mad
eira or even cognac. Stir in mushroom mixture, heat through and
serve the sauce with the poached fish. This takes only about 15
minutes, and is virtually foolproof. (I "proofed" it just recent
ly while on vacation: At the last minute, discovering that the f
lour bin was empty, I resorted to a handful of crushed dried ric
e cereal belonging to my 8-month-old niece, and they ate it anyw
ay.) (4,548) edit82ap/wp5......................CompuServe, 12 Ap
r 82 .Wm Raspberry: Nuclear Civil Defense, Wash.Post, 12 Apr 82,
................................................................
Eve Zibart: Cooking & Entertaining, Wash.Post, 12 Ap 82, Cook.
```

Figure 4. The PHRASE *command specifying "poach" and "fish" searched out this portion of text containing poached fish.*

ing the second command above. If you wanted *inform, perform, transform,* and *uniform,* you would key in "Form" using the third command.

But the chief purpose of the FIND function in dictionary-making is to have large data banks of English texts belonging to various genres online to tap into for evidence of new words entering the vocabulary. The traditional method using a card file has been shown to be erratic in its results. In the just-published ninth edition of the best-selling *Merriam-Webster Collegiate Dictionary,* for example, which is supposed to reflect the new vocabulary of the decade since the eighth was published in 1973, relatively current terms such as computerist, bargaining chip, baby boom, fast lane, spreadsheet, X-rated, boardsailing, and checkbook journalism are not entered, while such rare and obsolescent ones as computernik, downsize, and white flight are.

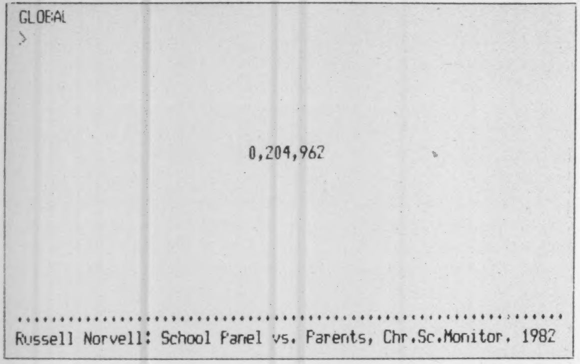
In common use, the FIND function of Lexicon comes in handy for locating related words, as *Reagan, Reagan's,* and *Reaganomics* in the text that is being analyzed. Since the stress of the Lexicon program is on the lexical or meaningful aspect of a word, the FIND routine is geared to finding words and phrases irrespective of spelling variants involving capital and lowercase letters, as in *XEROX/xerox, MacDonald/Macdonald,* and *However/however.* It also disregards punctuation marks and symbols which the computer simply reads as spaces.

The found word or phrase appears flashing in the center of the screen surrounded by text with its relevant bibliography or footnote displayed in the last line. If more context than is on the screen is desired, the text may be scrolled forward or backward to either end of the file using the up/down arrow keys. A printout of what is on the screen at any time may be obtained by pressing a specified key.

To get the next occurrence of the word or phrase being searched, the ENTER key is pressed and held momentarily. This process may be repeated until the end of the online file is reached and the computer returns to the READY prompt. The BREAK key is used to interrupt the search at any time and FIND another word or phrase.

Using the PHRASE function, you can locate strings that are discontinuous and variable, to a maximum length of 32 characters and spaces, within initial and final characters that must be specified in the command. Thus, by keying in "g" followed by "together" you could search for variants of a phrase such as *get together, get it together, get it all together, get himself together, get your act together,* and *got it together* (Figure 3). Or, by keying in "la" followed by "claim" you could find occurrences of *lays claim* and *laid no claim.* Leaving no space after "claim" will net occurrences such as *laying claims.*

A popular use of this function would be to locate portions of text containing two specified key words as, say, *poach*



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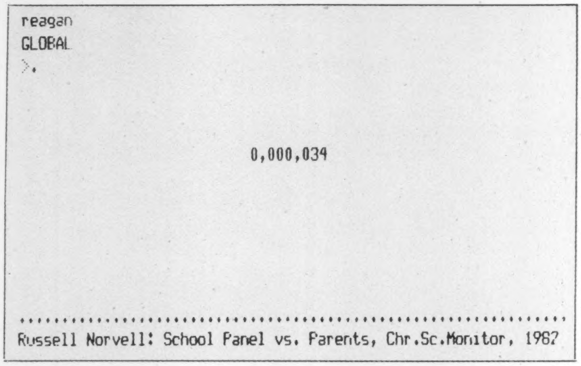
GLOBAL
>

                        0,204,962

..........................................................
Russell Norvell: School Panel vs. Parents, Chr.Sc.Monitor, 1982
```

Figure 5a. The COUNT *command counts the total number of words in the on-line file. In the file that ended with the Russell Norvell story, there were over 200,000 words on three 80-track double density drives.*

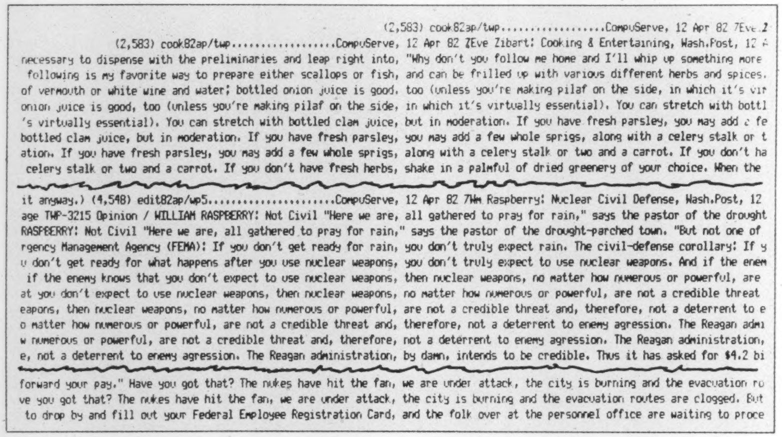


```
reagan
GLOBAL
>.

                        0,000,034

..........................................................
Russell Norvell: School Panel vs. Parents, Chr.Sc.Monitor, 1982
```

Figure 5b. The COUNT *command is also used to take a count of the number of times a specified string occurs online, as "Reagan" in the above file.*



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                (2,583) cook82ap/twp..................CompuServe, 12 Apr 82 7Eve Zibart: Cooking & Entertaining, Wash.Post, 12 A
necessary to dispense with the preliminaries and leap right into, "Why don't you follow me home and I'll whip up something more
 following is my favorite way to prepare either scallops or fish, and can be frilled up with various different herbs and spices.
of vermouth or white wine and water; bottled onion juice is good, too (unless you're making pilaf on the side, in which it's vir
onion juice is good, too (unless you're making pilaf on the side, in which it's virtually essential). You can stretch with bottl
's virtually essential). You can stretch with bottled clam juice, but in moderation. If you have fresh parsley, you may add a fe
bottled clam juice, but in moderation. If you have fresh parsley, you may add a few whole sprigs, along with a celery stalk or t
ation. If you have fresh parsley, you may add a few whole sprigs, along with a celery stalk or two and a carrot. If you don't ha
 celery stalk or two and a carrot. If you don't have fresh herbs, shake in a palmful of dried greenery of your choice. When the

it anyway.) (4,548) edit82ap/wp5......................CompuServe, 12 Apr 82 7Wm Raspberry: Nuclear Civil Defense, Wash.Post, 12
age TWP-3215 Opinion / WILLIAM RASPBERRY: Not Civil "Here we are, all gathered to pray for rain," says the pastor of the drought
RASPBERRY: Not Civil "Here we are, all gathered to pray for rain," says the pastor of the drought-parched town. "But not one of
rgency Management Agency (FEMA): If you don't get ready for rain, you don't truly expect rain. The civil-defense corollary: If y
u don't get ready for what happens after you use nuclear weapons, you don't truly expect to use nuclear weapons. And if the enem
 if the enemy knows that you don't expect to use nuclear weapons, then nuclear weapons, no matter how numerous or powerful, are
at you don't expect to use nuclear weapons, then nuclear weapons, no matter how numerous or powerful, are not a credible threat
eapons, then nuclear weapons, no matter how numerous or powerful, are not a credible threat and, therefore, not a deterrent to e
o matter how numerous or powerful, are not a credible threat and, therefore, not a deterrent to enemy agression. The Reagan admi
w numerous or powerful, are not a credible threat and, therefore, not a deterrent to enemy agression. The Reagan administration,
e, not a deterrent to enemy agression. The Reagan administration, by damn, intends to be credible. Thus it has asked for $4.2 bi

forward your pay." Have you got that? The nukes have hit the fan, we are under attack, the city is burning and the evacuation ro
ve you got that? The nukes have hit the fan, we are under attack, the city is burning and the evacuation routes are clogged. But
 to drop by and fill out your Federal Employee Registration Card, and the folk over at the personnel office are waiting to proce
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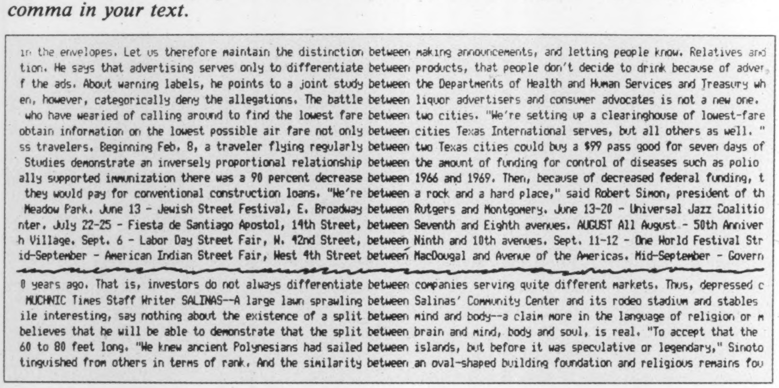
Figure 6. By drawing up a concordance you can check the pattern of usage of every comma in your text.



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in the envelopes. Let us therefore maintain the distinction between making announcements, and letting people know. Relatives and
tion. He says that advertising serves only to differentiate between products, that people don't decide to drink because of adver
f the ads. About warning labels, he points to a joint study between the Departments of Health and Human Services and Treasury wh
en, however, categorically deny the allegations. The battle between liquor advertisers and consumer advocates is not a new one.
 who have wearied of calling around to find the lowest fare between two cities. "We're setting up a clearinghouse of lowest-fare
obtain information on the lowest possible air fare not only between cities Texas International serves, but all others as well. "
ss travelers. Beginning Feb. 8, a traveler flying regularly between two Texas cities could buy a $99 pass good for seven days of
 Studies demonstrate an inversely proportional relationship between the amount of funding for control of diseases such as polio
ally supported immunization there was a 90 percent decrease between 1966 and 1969. Then, because of decreased federal funding, t
 they would pay for conventional construction loans. "We're between a rock and a hard place," said Robert Simon, president of th
 Meadow Park. June 13 - Jewish Street Festival, E. Broadway between Rutgers and Montgomery. June 13-20 - Universal Jazz Coalitio
nter. July 22-25 - Fiesta de Santiago Apostol, 14th Street, between Seventh and Eighth avenues. AUGUST All August - 50th Anniver
h Village. Sept. 6 - Labor Day Street Fair, W. 42nd Street, between Ninth and 10th avenues. Sept. 11-12 - One World Festival Str
id-September - American Indian Street Fair, West 4th Street between MacDougal and Avenue of the Americas. Mid-September - Govern

0 years ago. That is, investors do not always differentiate between companies serving quite different markets. Thus, depressed c
 MUCHNIC Times Staff Writer SALINAS--A large lawn sprawling between Salinas' Community Center and its rodeo stadium and stables
ile interesting, say nothing about the existence of a split between mind and body--a claim more in the language of religion or m
believes that he will be able to demonstrate that the split between brain and mind, body and soul, is real. "To accept that the
60 to 80 feet long. "We knew ancient Polynesians had sailed between islands, but before it was speculative or legendary," Sinoto
tinguished from others in terms of rank. And the similarity between an oval-shaped building foundation and religious remains fou
```

Figure 7. A concordance helps you study the pattern of usage of any word or phrase in the text.

and *fish*, thus narrowing your search (Figure 4).

Your Lex Count

This function is used to get a count of the total number of times a specified string occurs in the online file in the free, prefixed, suffixed, or infixed position. Various literary and linguistic frequency counts may be made using this function, from how many times the first person singular is used in a text to how much more frequent is the spelling sequence *ei* than *ie* to whether *quantum jump* is more frequently used in current English than *quantum leap*. The COUNT commands are varied, using the same kind of spacing as the FIND routine.

However, the most popular use of this function will be to count the total number of words in a book or text. For this purpose, a space is used in the command instead of a string and the resulting count plus one will be the total word count since all spaces between words were reduced to one each in the course of loading into mainfile (Figure 5).

The Lex Dance

Our concordance is a lining up of identical strings of characters in a text with a few words of context preceding and following each. It is the easiest device for taking a quick look at a book-length text from various angles based on words or for polling writers represented in a file on points of grammar and usage relating to particular words.

Are commas being used consistently in the text? Is there a distinction between *bibliographic* and *bibligraphical* with regard to usage if not meaning? In what syntactical settings is *different* followed by *from*, *than*, or *to*? Is *between* used only to show relationships between two terms—is it always *among* more than two? Does the consensus favor *If I were* over *If I was* for conditions contrary to fact? All such questions can be polled by commanding a concordance of the key words or phrases involved; that is, if your file is composed of carefully selected texts (Figures 6, 7).

In ordinary use, the concordance function helps editors and indexers to line up the key words of a book or text and print out a master list which can then be used for closer study of the text using the FIND function (Figure 8).

Concordances are prepared in sets of 78 lines 128 characters wide. You must scroll right and left to read either end of the 64-character display. Pressing the CLEAR key provides a printout of a concordance after which the computer automatically proceeds to prepare another concordance from the next portion of the file. The BREAK key is used to command a new concordance with a different string.

As in the FIND routine, the commands may be varied in four ways to draw up a concordance of the particular string you want: in the free, prefixed, suffixed, or infixed position.

Your Lex Profile

Alphabetization and the three remaining routines proceed at about 1000 words a minute, perhaps the fastest at which so much sorting and merging can be done by a micro of less than 2MHz clock speed. If that is not fast enough, consider that your workhorse will never take even a coffee break, and the work will be done and waiting for you when you return from lunch.

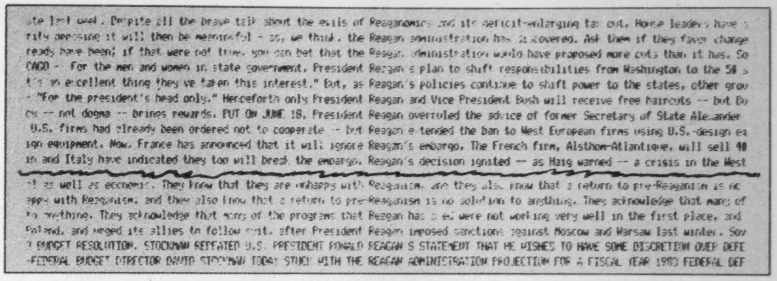
Alphabetization is useful not only in vocabulary studies but also for reading proofs of books that have been typeset. To catch typos and such spelling errors, just check the alphabetical printout for unusual forms and then comb the file using the FIND routine for their exact locations.

> **_Alphabetization is useful not only in vocabulary studies but also for reading proofs of books that have been typeset._**

Another routine that is based on alphabetization is Comparison of Vocabularies, a routine which enables you to check two files against each other and print out the differences in vocabulary.

A third routine that is very useful for students of vocabulary as well as dictionary makers is frequency-ranking. You can rank *the*, *of*, *and*, *to*, *a*, *in*, *is*, *you*, *that*, *it*, or whatever, depending on the vocabulary used in the text being studied. A ranked list gives a profile of the writer's diction and reveals many other facets of the English language that are of technical interest to the linguist or lexicographer. ☐

Thomas M. Paikeday is chief editor of *The New York Times Everyday Dictionary* published by Times Books, 1982, 1776 Chalkdene Grove, Mississauga, Ontario, Canada L4W 2C3.



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ate last week. Despite all the brave talk about the evils of Reaganomics and its deficit-enlarging tax cut, House leaders have s
rily opposing it will then be meaningful - so, we think. the Reagan administration has discovered. Ask them if they favor change
ready have been; if that were not true, you can bet that the Reagan administration would have proposed more cuts than it has. So
CAGO -- For the men and women in state government, President Reagan's plan to shift responsibilities from Washington to the 50 s
t's an excellent thing they've taken this interest." But, as Reagan's policies continue to shift power to the states, other grou
- "For the president's head only." Henceforth only President Reagan and Vice President Bush will receive free haircuts -- but Bu
cy -- not dogma -- brings rewards. BUT ON JUNE 18, President Reagan overruled the advice of former Secretary of State Alexander
 U.S. firms had already been ordered not to cooperate -- but Reagan extended the ban to West European firms using U.S.-design eq
ign equipment. Now, France has announced that it will ignore Reagan's embargo. The French firm, Alsthom-Atlantique, will sell 40
in and Italy have indicated they too will break the embargo. Reagan's decision ignited -- as Haig warned -- a crisis in the West

al as well as economic. They know that they are unhappy with Reaganism, and they also know that a return to pre-Reaganism is nc
appy with Reaganism, and they also know that a return to pre-Reaganism is no solution to anything. They acknowledge that many of
to anything. They acknowledge that many of the programs that Reagan has cut were not working very well in the first place, and
Poland, and urged its allies to follow suit. after President Reagan imposed sanctions against Moscow and Warsaw last winter. Sov
3 BUDGET RESOLUTION. STOCKMAN REPEATED U.S. PRESIDENT RONALD REAGAN S STATEMENT THAT HE WISHES TO HAVE SOME DISCRETION OVER DEFE
-FEDERAL BUDGET DIRECTOR DAVID STOCKMAN TODAY STUCK WITH THE REAGAN ADMINISTRATION PROJECTION FOR A FISCAL YEAR 1983 FEDERAL DEF
```

Figure 8. You can use a concordance to line up key words of a book for indexing.

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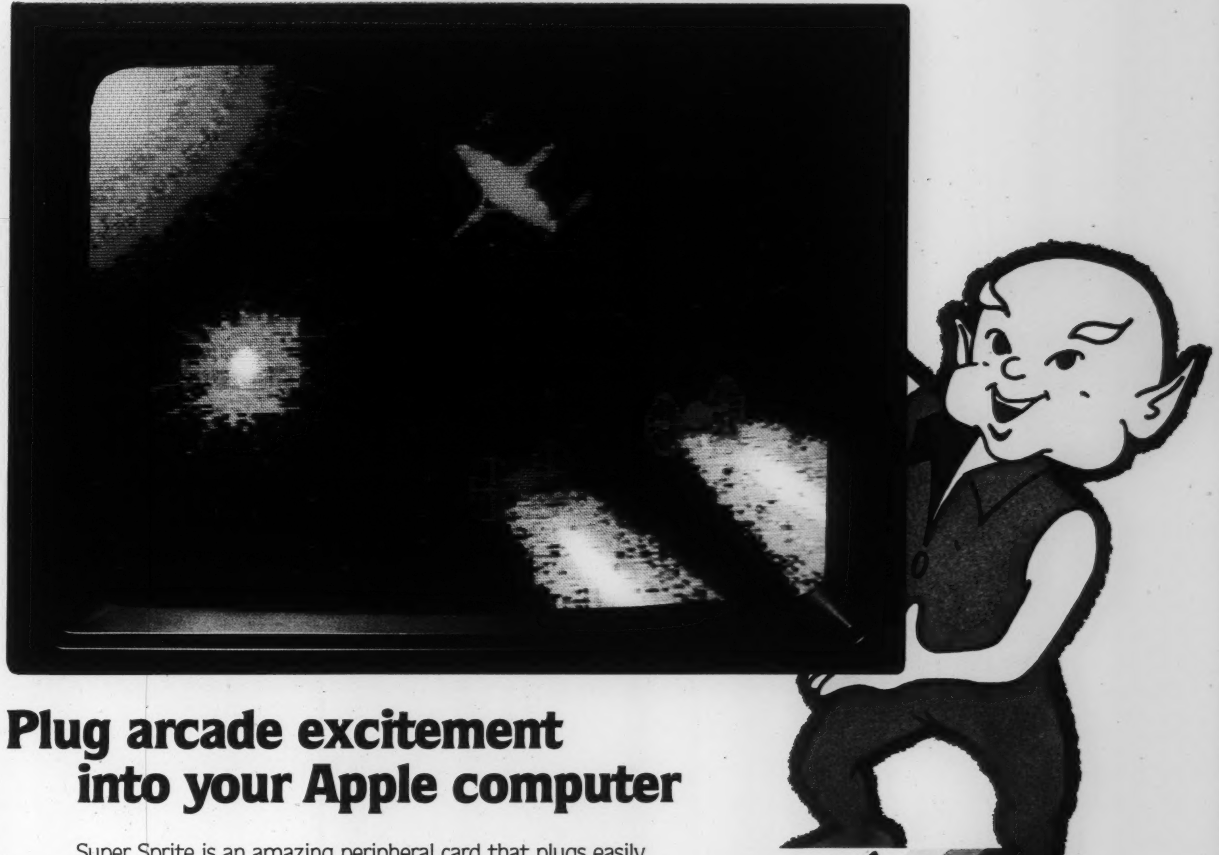

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CIRCLE 223 ON READER SERVICE CARD

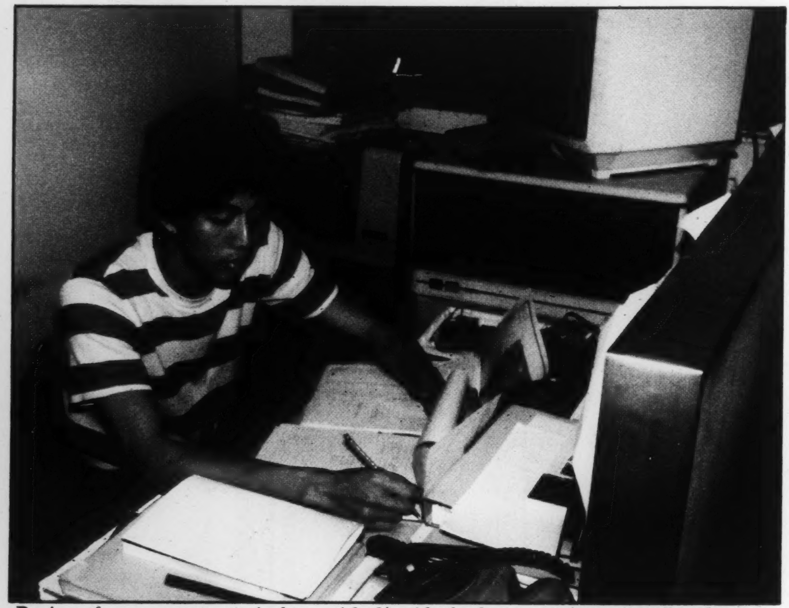
The Making of a Small Computer

David H. Ahl

We recently had an opportunity to tour the Video Technology factory in Hong Kong. There we saw the design and assembly of pocket games, video games, and small computers. Although Video Technology has recently moved to more spacious quarters, the steps in making a product are much the same as they are pictured here.

FREDER CENTRE

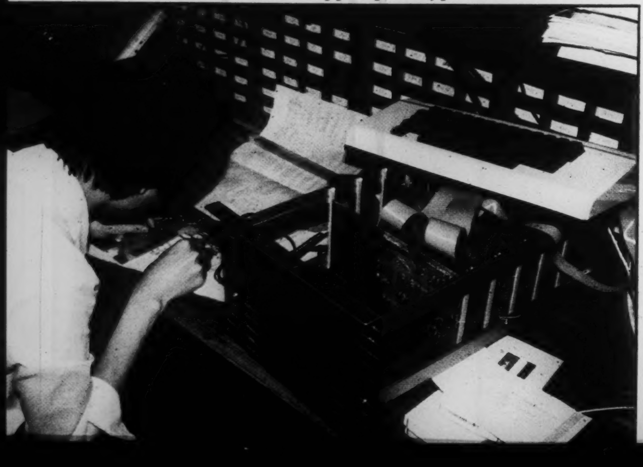
Freder Centre is typical of the manufacturing buildings in Hong Kong.



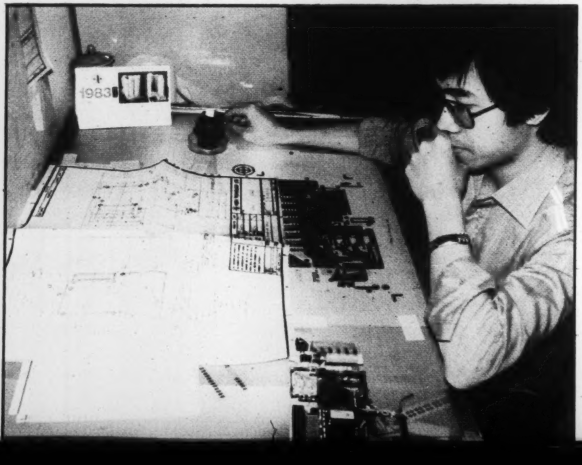
Photos by David Ahl

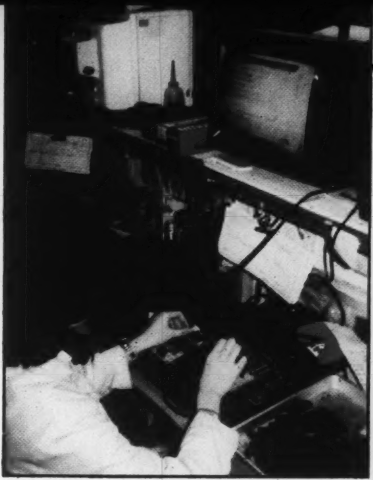
Design of a new computer is done with the aid of other computers, pencil and paper, and human ingenuity.

Next, a wire wrapped prototype is made and tested.



Then, working drawings of the PC boards are produced.



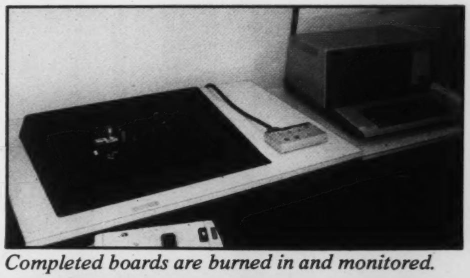


Incoming mpu's and IC's are thoroughly tested.

After component insertion, a wave soldering machine solders all the components uniformly to the PC board.

Subassemblies, switches, and connectors are added to the main PC board.

Overview of the assembly line.



Completed boards are burned in and monitored.

If a board fails the test procedure, it is either fixed or scrapped.

The computer is then tested with a full complement of peripheral devices attached.

After final assembly, each computer is loaded with a program that checks all of its memory and other operations.

Final burn-in of Laser 200 computers prior to packaging. (The machine is sold as the V-Tech VZ200 in the United States.)

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CIRCLE 301 ON READER SERVICE CARD

Deciphering the "Protected" Code of MBasic

Murray L. Lesser

It is always comforting to discover that the publisher of a proprietary program has been kind enough to include source code on the distribution disk. Then, when you need to change the program to fit your revised circumstances or fix a bug in which the vendor has no interest, you can do it yourself. Unfortunately, few publishers of proprietary software offer source code with their packages.

One general exception is software written to run under Microsoft's Basic interpreter. You can *always* recover the source code for one of these programs. Even if the program has been saved in the P (for protect) mode, for the sake of program integrity. (You cannot accidentally delete a line while in direct mode after you load a protected program.) Of course, the interpreter is not supposed to LIST, EDIT, or even SAVE protected code. But it will, with the proper inducement.

In what follows, I will show you how to get Basic-80 to tell all it knows about a protected program. The examples will be for my version of MBasic, which runs under CP/M. However, I am sure you can extend the technique to use with other versions and other operating systems.

I will show you how to get Basic-80 to tell all it knows about a protected program.

We are going to give the Basic-80 interpreter two almost identical programs to load. The program names will be different (so we and the system can tell them apart); one will be saved with the P option while the other will not. Then, we will let Basic-80 examine its own innards while it contains each of the two programs, and look for differences.

As you might expect, the important

```
A>MBASIC
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
31483 Bytes free
Ok
10 PRINT "THIS IS A TEST"
20 PRINT 23 " SKIDOO"
30 SYSTEM
SAVE "TEST1"
Ok
SAVE "TEST2",P
Ok
RUN
THIS IS A TEST
 23  SKIDOO

A>
```

Note: Underlined characters entered from keyboard.

Figure 1. Manufacturing Test Program Files.

difference is limited to a single *flag* byte. If we change the flag, the interpreter will forget that the program was supposed to be protected. Once you know the address of that flag byte for your system, you can LIST, EDIT, or SAVE any protected Basic-80 program you may encounter.

The Test Programs

You must start by writing a test program that will be saved in two modes. Figure 1 is a printout of my CRT screen while making the two program load modules. If your version of the Basic-80 interpreter does not have the SYSTEM command (line 30), use its equivalent to get out of Basic and back to your operating system.

Figure 2 shows CP/M Dynamic Debugging Tool (DDT) images of the two test programs, as saved. DDT loads the requested files (in this case, TEST1.BAS and TEST2.BAS) into the transient program area (TPA) of CP/M before examining them. For "standard" CP/M, TPA starts at location 0100 (hex). Thus, the addresses shown down the left-most column are the memory addresses (in hex) for every sixteenth byte, starting at that value. The next 16 columns are the contents of those 16 locations, also in hex. The right-most block contains the corresponding ASCII characters, or a period if the ASCII character is not printable.

Figure 2a is a portion of the DDT image of TEST1.BAS, which has been stored in *compressed binary* (or *token*) form. The interpreter knows this is a token program load module because it starts with the byte FF. The image of the first program line starts at address 0101. After the module is loaded, the two bytes 1E 62 tell the interpreter that the *next* Basic line will start at memory location 621E.

The following two bytes are the line number, 000A (hex for 10 decimal). The line ends with a 00 byte (image address 0117). Each line of the original program is coded in this format. The non-existent *last* line of the program starts at the location 6237, and consists of two 00 bytes in succession (addresses 0131-0132, in this image). The remainder of the load module contains "left over" bytes to pad out the 128-byte sector.

Figure 2b is the similar image of TEST2.BAS, the protected version of the same program. Note that it starts with an FE instead of an FF. No "program" byte is identical to that in the same location in the unprotected load module, although the two forms occupy the same space. The padding bytes following the end of the program (starting at address 0133) are identical to those in Figure 2a.

Don't assume that the flag byte in your system is at the same location as it is in mine.

Figure 2c is a DDT image of TEST2.BAS as loaded into my version of MBasic. (I shall show you how to examine the insides of MBasic with DDT later.) If you compare this with Figure 2a, you will note that the LOAD operation decoded the protected code. The resulting token program (starting at 6207) is identical to that of the unprotected program.

```
0100 FF 1E 62 0A 00 91 20 22 54 48 49 53 20 49 53 20 ..b... "THIS IS
0110 41 20 54 45 53 54 22 00 31 62 14 00 91 20 0F 17 A TEST".1b... ..
0120 20 22 20 53 4B 49 44 4F 4F 22 00 37 62 1E 00 BD  " SKIDOO".7b...
0130 00 00 00 1A 98 07 AF 32 93 07 32 64 0A 32 F3 0B .......2..2d.2..
```

Figure 2a. DDT image of TEST1.BAS.

```
0100 FE EA 1A 2B C1 5B F7 85 14 20 16 05 F1 7C 62 F0 ...+.[... ...¶b.
0110 98 52 16 C6 F1 C1 33 60 FB 52 9B 9D 72 39 4D 70 .R....3°.R..r9Mp
0120 4A C9 1E F4 48 2B 18 E1 A6 ED F0 D0 4C C9 AB 78 J...H+......L..x
0130 ED 05 93 1A 98 07 AF 32 93 07 32 64 0A 32 F3 0B .......2..2d.2..
```

Figure 2b. DDT image of TEST2.BAS.

```
6200 CA 28 62 60 69 6E 00 1E 62 0A 00 91 20 22 54 48 .(b°in..b... "TH
6210 49 53 20 49 53 20 41 20 54 45 53 54 22 00 31 62 IS IS A TEST".1b
6220 14 00 91 20 0F 17 20 22 20 53 4B 49 44 4F 4F 22 ... .. " SKIDOO"
6230 00 37 62 1E 00 BD 00 00 00 C2 04 44 44 01 D4 00 .7b........DD...
```

Figure 2c. DDT image of TEST2 in MBasic.

All we have to do now is find the flag byte that tells MBasic it contains a protected program, and change it.

Finding The Flag

We will find the flag by comparing two files, each of which is a byte-by-byte image of a portion of MBasic as loaded with each of the two programs. Figure 3 shows my CRT screen while making and storing the image of MBasic containing TEST1.BAS. The SAVE following the second CP/M prompt (A>) is not the Basic SAVE; it is the CP/M built-in utility of the same name. I saved 11 pages under the name TEST1.COM for later comparison. I arrived at that number by experiment; it is the minimum number of pages that includes the flag for my version.

Follow the same procedure with the protected program, running TEST2.BAS under MBasic and saving the memory contents as TEST2.COM.

Once you have the two .COM files, finding the flag is simple. Compare them byte-by-byte and record any differences, using an appropriate computer program to make the comparison. You can use any file comparison program you happen to have. In case you don't have one, I have provided COMPARE.BAS (Listing 1).

Figure 4 shows the results of running COMPARE.BAS on TEST1.COM and TEST2.COM. There are only two differences. Address 0803H contains 31H (ASCII 1) for TEST1.COM and 32H (ASCII 2) for TEST2.COM. Obviously, address 0803H in my version of MBasic is a portion of the file control block used for loading the program to be run.

The other difference shows our old friend FE. Address 0BEC is the flag byte. It contains 00 for the unprotected program and FE for the protected one. (There are no printable ASCII equivalents for either byte.) To *unprotect* a program, all we have to do is to set the flag byte to zero *after* we have loaded in the program.

You might think you could

```
POKE &H0BEC,00
```

and the task would be finished. Unfortunately, things are not quite that simple. One of the things Microsoft's manual doesn't tell you is that direct mode PEEK and POKE are inoperative when the interpreter is guarding a protected program. So, more drastic measures are required.

Changing The Flag

Since we can't POKE our way to success, we shall have to arrange to have

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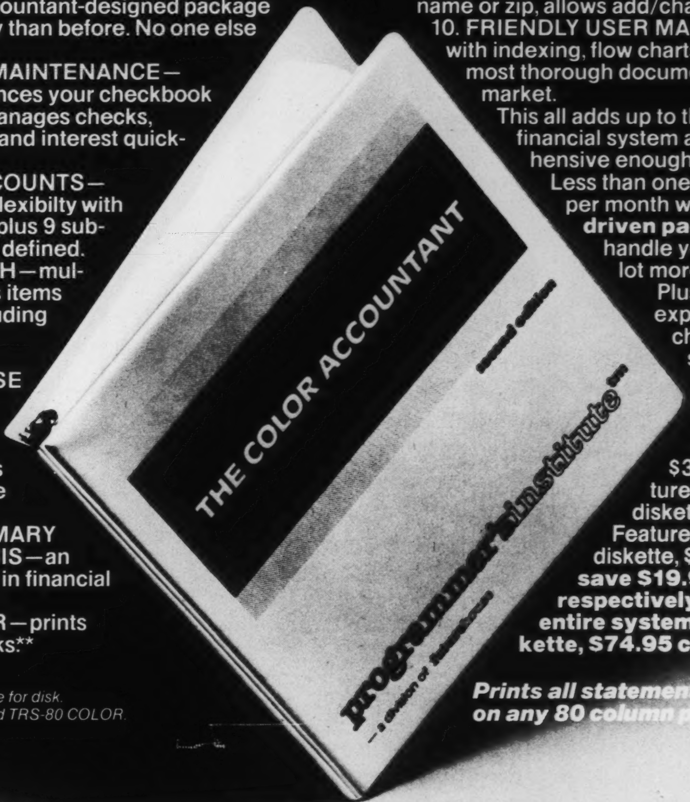

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CIRCLE 206 ON READER SERVICE CARD

```
A>MBASIC TEST1
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
31483 Bytes free
THIS IS A TEST
 23  SKIDOO

A>SAVE 11 TEST1.COM
A>
```

Note: Underlined characters entered from keyboard.

Figure 3. Making TEST1.COM for Comparison.

```
A>MBASIC COMPARE
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
31483 Bytes free
First <filename> (ALL CAPS)? TEST1.COM
Second <filename> (ALL CAPS)? TEST2.COM
ADDRESS  TEST1.COM              TEST2.COM
0803     31 (1)                 32 (2)
0BEC     00                     FE
Comparison ended at 0BFF

A>
```

Note: Underlined characters entered from keyboard.

Figure 4. Comparing the Files.

the interpreter run under DDT (or some other monitor) and use the monitor to get around the defenses of Basic. The technique, tested on our protected TEST2.BAS, is shown in Figure 5. Once you have done it with a test case, you are ready to try real live protected programs.

To start, you must know two system-dependent locations. One is where *your* Basic-80 interpreter will check to see if any additional information was included in the command line (e.g., the name of a program to be run, as in Figures 3 and 4). For CP/M, this location is the beginning of the *temporary buffer* (tbuff). For "standard" systems, tbuff starts at memory location 0080H. Most "modified" CP/M systems use location 4280H. Non-CP/M operating systems may use other locations.

The other necessary address is the location to which your monitor jumps on a break-point interrupt. For CP/M monitors (DDT, SID, and ZSID) this is 0038H (or 4238H). Other monitors may use other locations.

Once you know these two addresses for your system, the rest is like following a cookbook procedure. Figure 5 uses DDT, because it was handy. Before giving the "Go" to MBasic under DDT, set the "run program" flag to zero (to get rid of DDT's left over) using the "Substitute" command (note 1 in Figure 5) of the monitor.

After you are in MBasic, use LOAD to load the protected program. Just to show what happens, I tried to list TEST2.BAS and got an illegal function call for my trouble.

Now you must get back to DDT. The two direct mode commands starting at note 2 will do it. I have displayed the contents of the 16 bytes starting at 0BE0, just to show the flag, FE, *in situ* (note 3). The actual code breaking occurs by zeroing byte 0BEC (note 4).

```
A>DDT MBASIC.COM
DDT VERS 2.2
NEXT  PC
6100 0100
-S80                                                [Note 1]
0080 35 00
0081 2D .
-G
BASIC-80 Rev. 5.21
[CP/M Version]
Copyright 1977, 78, 79, 80 (C) by Microsoft
Created: 15-Dec-80
27381 Bytes free
Ok
LOAD "TEST2"
Ok
LIST
Illegal function call
Ok
LET DDT=&H38                                        [Note 2]
Ok
CALL DDT
*4DC9
-D0BE0,0BEF                                         [Note 3]
0BE0 00 00 00 00 00 00 38 00 00 00 80 00 FE 00 00 00 ......8.........
-S0BEC                                              [Note 4]
0BEC FE 00
0BED 00 .
-G
Ok
LIST
10 PRINT "THIS IS A TEST"
20 PRINT 23 " SKIDOO"
30 SYSTEM
Ok
RUN
THIS IS A TEST
 23  SKIDOO

A>
```

Note 0: Underlined characters entered from keyboard.
Note 1: 80H must be set to zero to prevent MBasic from looking for wrong file.
Note 2: Entry point for DDT (or SID or ZSID).
Note 3: Looking at FE flag in 0BEC (hex).
Note 4: Turning off flag by setting 0BEC to zero.

Figure 5. Making MBasic Decipher Itself.

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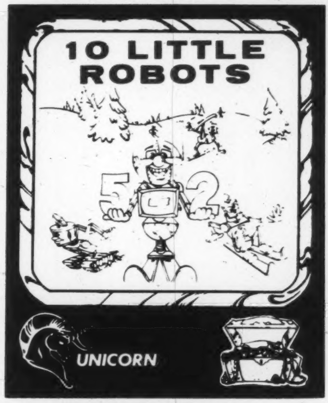

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48K and one disk drive.
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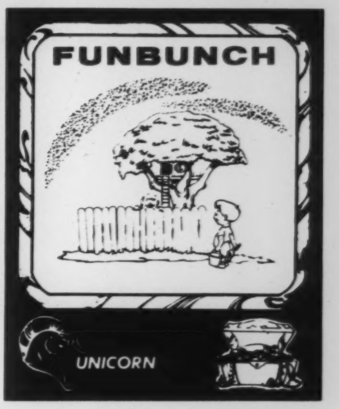

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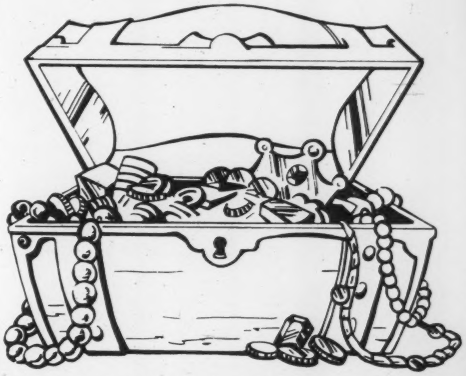

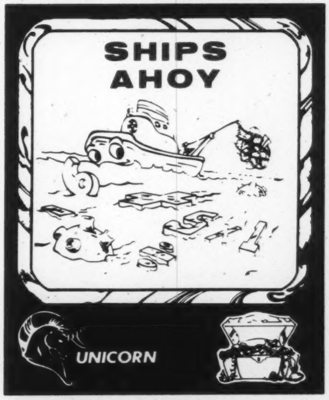

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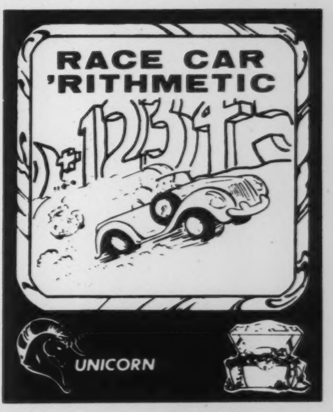

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CIRCLE 248 ON READER SERVICE CARD

Leave DDT with the G command, and you will again see the MBasic Ok prompt. Just to prove it works, I have listed TEST2.BAS, in its newly unprotected state.

Don't assume that the flag byte in your system is at the same location as it is in mine. Run through the entire procedure and locate yours for yourself. After you have found it, make a note in your programmer's notebook so you will be able to unprotect any Basic-80 load module. Once the flag has been set to zero, you can save the program (preferably under another name) in the unprotected mode for later reference.

The File Comparison Program

The file comparison program COMPARE.BAS (Listing 1) has some characteristics that may be of interest beyond its intrinsic value as a utility. It has been carefully written to run when compiled with Microsoft's Basic-80 compiler BASCOM. This is not the trivial task you might think it to be. Not all usable MBasic programs will run properly when compiled with BASCOM; some won't even compile.

The major additions are the DEFINT statement (line 1000) and the CLOSE #1 statements in the error traps (line 60010-60020), none of which are necessary for proper operation under MBasic. However, these make the program useful for anyone who owns BASCOM, does not own MBasic, and doesn't already have a file-compare utility. I should point out that the program will not run noticeably faster when compiled because it is file-input limited.

The program was written with Microsoft's Edit-80 line editor, rather than with the MBasic built-in editor, mostly for convenience but also for appearance. You must turn off the high-order bits on the line numbers, as left by Edit-80, to get such a program to run or compile. (Use the CP/M PIP utility to PIP COMPARE.BAS to itself with the (Z) parameter.)

Lines 1060-1130 are an existence test with error trap to make sure you have properly entered the filenames to be compared. The error trap gives you another chance when you make an entry typo, without having to restart the whole process.

Most file comparison programs indicate the location of the difference as a count from the beginning of the file. Since this one was intended to compare memory image files, I show the actual memory address. This is obtained by initializing COUNT to one less than the TPA starting address (line 2010). To change the traditional mode, initialize COUNT to zero.

The target files are read as 128-character records in random mode. Each file buffer is fielded as a single 128-byte string (lines 1210-1240).

The program has been structured for speed. The major loop (lines 2040-2090) tests the string pair for equality. If there isn't any difference, it fetches another pair of records, continuing until the shorter file has been checked in its entirety. If there is a difference, the differing bytes are found in the subroutine starting at line 3000 and displayed in the subroutine starting at line 4000, using the format subroutines in lines 5000-5030 and 5500-5540. Note that EXPAND and ITEM are local variables used by the format subroutines.

According to Microsoft's *Basic-80 Reference Manual*, the End of File (EOF) function doesn't work when in random mode, except in CP/M versions. If it doesn't work in yours, use the substitute major loop in Listing 2.

I tested both forms of COMPARE.BAS, both as an MBasic and as a BASCOM program, under my hardware vendor's versions of both CP/M 1.4 and CP/M 2.2.

For obvious reasons, I couldn't test the unprotect procedure for other versions of Basic-80 running other operating systems. If your version is different, going through the general methodology should work for you, even though the details may vary. After all, Microsoft is a successful software vendor and successful software vendors don't usually reinvent successful constructs. ☐

Listing 1. COMPARE.BAS.

```
00010   '               ************************
00020   '               ***   COMPARE.BAS   ***
00030   '               ************************
00040   '
00050   '       Program to compare two files, byte-by-byte,
00060   '          and display differences.
00070   '
00080   '       Written by M. L. Lesser, 11/12/82
00090   '       Written for Microsoft MBASIC v 5.21 with CP/M
00100   '
01000   DEFINT I,R          'INDEX,ITEM,RECORD
01010   DEFSNG C,E          'COUNT,EXPAND
01020   DEFSTR F,T          'FILE1,FILE2,TEXT1,TEXT2,T1,T2
01030   '
01040   ON ERROR GOTO 60000             'Error trap
01050   '
01060   '       Check files to compare:
01070   INPUT "First <filename> (ALL CAPS)"; FILE1
01080   OPEN "I", #1, FILE1             'Check for existence
01090   CLOSE #1
01100   INPUT "Second <filename> (ALL CAPS)"; FILE2
01110   OPEN "I", #1, FILE2             'Check for existence
01120   CLOSE #1
01130   '
01200   '       Open files for comparison:
01210   OPEN "R", #1, FILE1, 128        'Use random mode
01220   OPEN "R", #2, FILE2, 128
01230   FIELD #1, 128 AS TEXT1
01240   FIELD #2, 128 AS TEXT2
01250   '
01300   '       Display headers:
01310   PRINT "ADDRESS" TAB(10) FILE1 TAB(30) FILE2
01320   '
02000   '       Compare records:
02010   LET COUNT = &HFF        'One less than start of TPA
02020   LET RECORD = 1
02030   GET #1,RECORD: GET #2,RECORD            'First records
02040   WHILE (EOF(1) = 0) AND (EOF(2) = 0)
02050      IF TEXT1 <> TEXT2 THEN GOSUB 3000    'Compare detail
02060      LET COUNT = COUNT + 128
02070      LET RECORD = RECORD + 1
02080      GET #1,RECORD: GET #2,RECORD         'Next records
02090   WEND
02100   LET EXPAND = COUNT
02110   PRINT "Comparison ended at ";
02120   GOSUB 5000                              'Hex expansion
02130   PRINT
02140   CLOSE
02150   SYSTEM
02160   '
```

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```
03000   '       Compare detail
03010   FOR INDEX = 1 TO 128
03020      IF MID$(TEXT1,INDEX,1) <> MID$(TEXT2,INDEX,1)
                THEN GOSUB 4000          'Detail doesn't match
03030   NEXT INDEX
03040   RETURN
03050   '
04000   '       Detail doesn't match:
04010   LET EXPAND = COUNT + INDEX
04020   LET T1 = MID$(TEXT1,INDEX,1)
04030   LET T2 = MID$(TEXT2,INDEX,1)
04040   GOSUB 5000                               'Hex expansion
04050   PRINT TAB(10);
04060   LET ITEM = ASC(T1)
04070   GOSUB 5500                               'Display detail
04080   PRINT TAB(30);
04090   LET ITEM = ASC(T2)
04100   GOSUB 5500                               'Display detail
04110   PRINT
04120   RETURN
04130   '
05000   '       Hex address expansion to four digits:
05010   IF EXPAND < &H10 THEN PRINT "000" HEX$(EXPAND);
           ELSE IF EXPAND < &H100 THEN PRINT "00" HEX$(EXPAND);
           ELSE IF EXPAND < &H1000 THEN PRINT "0" HEX$(EXPAND);
           ELSE PRINT HEX$(EXPAND);
05020   RETURN
05030   '
05500   '       Display byte detail:
05510   IF ITEM < &H10 THEN PRINT "0" HEX$(ITEM);
                ELSE PRINT HEX$(ITEM);           'Byte in Hex
05520   IF ITEM > 31 AND ITEM < 128
                THEN PRINT " (" CHR$(ITEM) ")"; 'Printable ASCII
05530   RETURN
05540   '
60000   '       Error trap:
60010   IF ERR = 53 AND ERL = 1080 THEN PRINT
                CHR$(34) FILE1 CHR$(34) " does not exist. Try again":
                CLOSE #1: RESUME 1070
60020   IF ERR = 53 AND ERL = 1110 THEN PRINT
                CHR$(34) FILE2 CHR$(34) " does not exist. Try again":
                CLOSE #1: RESUME 1100
60030   ON ERROR GOTO 0
60040   '
```

Listing 2. Modifications.

Modifications to COMPARE.BAS for non-CP/M systems

1. Add another integer variable "INTENT" (change line 1000)

2. Insert line 1125 to tell program when file ends (standard MBASIC doesn't recognize EOF with random files):

```
01125   INPUT "How many pages to compare"; INTENT
```

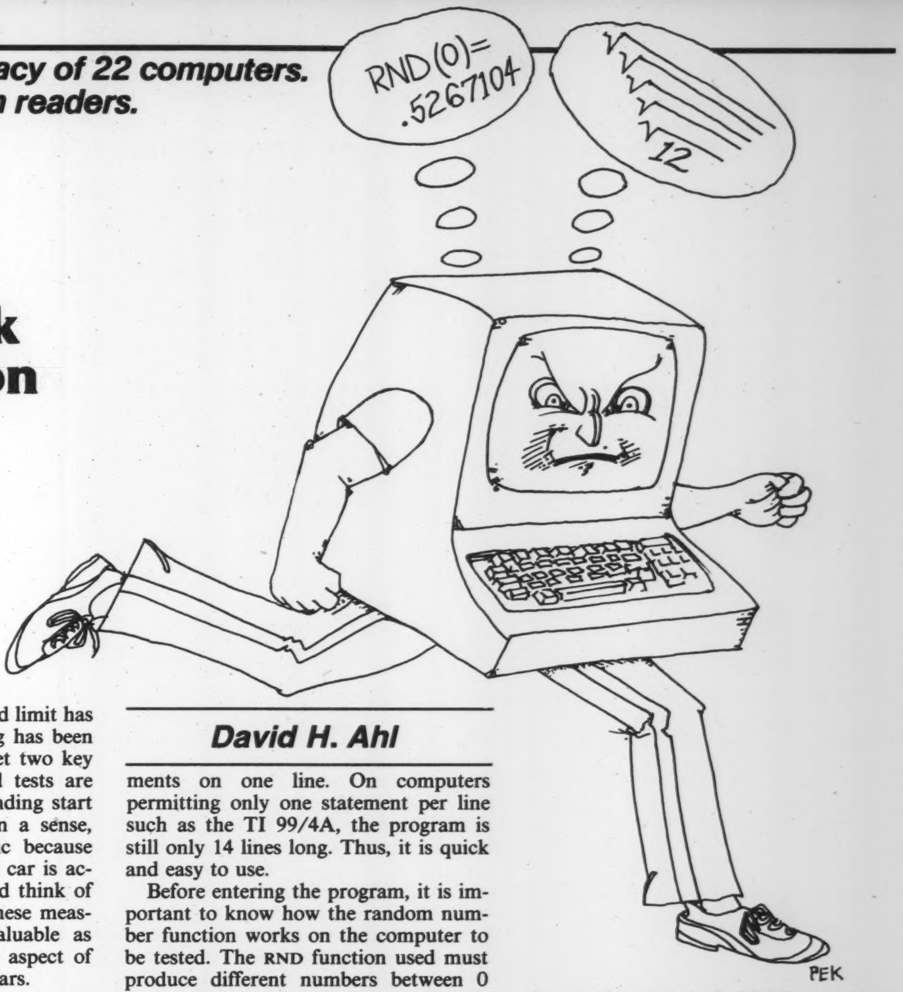
3. Delete lines 2000-2160 and substitute the following (inserting the proper initial value for COUNT in line 2010):

```
02000   '       Compare records:
02010   LET COUNT = <???>           'One less than start of TPA
02020   FOR RECORD = 1 TO 2 * INTENT
02030      GET #1,RECORD: GET#2,RECORD
02040      IF TEXT1 <> TEXT2 THEN GOSUB 3000    'Compare detail
02050      LET COUNT = COUNT + 128
02060   NEXT RECORD
02070   CLOSE
02080   END
02090   '
```

Note: If your version recognizes SYSTEM (or some other return to the operating system) use that in line 2080 instead of END.

Speed and accuracy of 22 computers. Help wanted from readers.

Benchmark Comparison Test



David H. Ahl

For years, the national speed limit has been 55 mph and drag racing has been outlawed on public roads. Yet two key measures in automobile road tests are the 0 to 60 time and the standing start quarter mile elapsed time. In a sense, both measures are unrealistic because they do not reflect the way a car is actually used, and no one would think of buying a new car based on these measures alone. But they are valuable as comparative measures of one aspect of the performance of different cars.

Likewise, the benchmark program presented here is not representative of the way computers are actually used; it measures only a few aspects of performance, and no one should buy a computer based solely on the results of these measures. Yet, the results provide some interesting comparative data.

The Benchmark Program

The program is just six lines long on computers which permit multiple statements on one line. On computers permitting only one statement per line such as the TI 99/4A, the program is still only 14 lines long. Thus, it is quick and easy to use.

Before entering the program, it is important to know how the random number function works on the computer to be tested. The RND function used must produce different numbers between 0 and 1. On some computers, RND(0) produces different numbers and RND(1) always produces the same one; on other computers, these functions are reversed. Some computers require only RND with no argument at all. In the benchmark program, be sure to use the function that produces different numbers or you will get erroneous results.

What It Measures

The program measures three things, the most important of which is execution speed in Basic. This speed measure is the time required to execute a main loop 100 times (lines 20 to 50) with two ten-statement loops inside (lines 30 and 40).

The first inside loop (line 30) takes the square root of the value of the outside loop index (N) ten times. In other words, if the program is executing the 49th outside loop, the first square root of 49 is 7, the second of 7 is 2.6457513, the third of 2.6457513 is 1.6265765, and so on. These successive values are stored in A.

The second inside loop (line 40) then takes the final value of A from the first loop and squares it ten times. If the computer was absolutely accurate, the final result should equal the starting value of the index. For instance, in the above example, the final value should be 49.

In line 50, all the values of A from 1 to 100 are summed and stored in S. The integers 1 to 100 when added together equal 1010. Line 60 prints out how much S differs from the correct total of 1010. This is a measure of accuracy.

One might argue that this is not a very

```
            Ahl's Simple Benchmark Test

  1 ' Ahl's simple benchmark test
  2 ' In Lines 30 and 40, some computers
  3 ' may require RND(1) for correct results
 10 PRINT " Accuracy  Random"
 20 FOR N=1 TO 100:A=N
 30 FOR I=1 TO 10:A=SQR(A):R=R+RND(0):NEXT I
 40 FOR I=1 TO 10:A=A 2:R=R+RND(0):NEXT I
 50 S=S+A:NEXT N
 60 PRINT ABS(1010-S/5);ABS(1000-R)
```

good measure of accuracy since one value of A might be high and another low, and they would cancel out the errors. Indeed, this is what happens to some extent. However, checking four computers with a more sophisticated (and much longer) measure of accuracy gave very similar results to this much simpler approach.

The last thing measured, the quality of the random number generator, is the least reliable. In this case, the program simply adds the value of 2000 random numbers keeping the running total in R. The values should be randomly distributed between 0 and 1. More simply, half of the values should be between 0 and 0.5 and the other half between 0.5 and 1. Thus the total of 2000 numbers should be 2000 × 0.5 or 1000. Line 60 prints out how much R differs from this theoretical value of 1000.

Since random numbers should be truly random, one cannot say that 2000 of them should be perfectly distributed around 0.5. Indeed, if a random number generator simply produced 0.1 and 0.9 alternately, it would give a perfect result in this test, yet it would hardly be producing random numbers.

On the other hand, the majority of programs that use random numbers do not use 500 numbers, much less 2000. Thus, from a purely pragmatic point of view, it is desirable that random numbers be uniformly distributed right from the start. Hence, this measure has some value, although it must be taken with a grain of salt.

Reading the Results

Naturally, the faster the execution time, the better. Times around two minutes were average. Anything under one minute is excellent while times over four minutes are quite slow.

The measure of accuracy should be as close to zero as possible. In the chart, all the exponential values (2.018 E-07, for example) have been converted to decimals. A value of 0.001 is about the norm. Anything larger than that (0.18, for example) is poor, while smaller values (0.00000021, for example) is very good.

The measure of randomness should also be as close to zero as possible. Anything under 10 is quite good. Values between 10 and 20 are acceptable. Values over 20 are not as good, but the random number generator may still be producing acceptably random numbers. In the chart, the numbers have been rounded to one decimal place.

As with nearly everything, there are tradeoffs. Some computers are fast, but not especially accurate. Others are accurate but slow. Those that rank high on several facets tend to be more expensive than those that do not. Some of the slower units do all their calculations in double precision and can gain a bit of speed by specifying single precision variables; of course, this speed improvement will be at the expense of accuracy.

Some computers are fast, but not especially accurate.

Actual Results

The fastest computer tested to date is the Olivetti M20, a 16-bit computer using Microsoft-like Basic with PCOS, a proprietary operating system. However, its accuracy is nothing to brag about.

Nevertheless, the M20 is about twice as fast as the IBM PC which has virtually the same accuracy. In the same price and speed range, the Computer Devices DOT is marginally faster than the IBM PC, but has twice the accuracy.

The Vectrex tested was a prototype add-on to the GCE Vectrex video game unit; production units may not be exactly the same. The Laser 2001, an Apple work-alike from Hong Kong was also a prototype.

Fastest computer in the low price category, and also one of the most accurate, is the Panasonic JR200. At $300, this is a remarkable performer.

The Aquarius and NEC 8201 were the least accurate of the computers tested. It is interesting to compare the virtually identical TRS-80 Model 100 to the NEC 8201; accuracy of the Model 100 is considerably better because all calculations are done with four-byte (double-precision) numbers, but speed suffers badly.

Most of the 6502-based machines complete the timed loop in roughly the same time and produce identical accuracy figures. This includes the Apple, Vic, and Commodore 64. Likewise, the Z80- and 6800-based machines are quite similar within families.

Two calculator-like machines are among the slowest, the TI CC-40 and Casio FP-200. However, the TI more than makes up for its slow speed with its excellent accuracy, whereas the Casio does not.

Slowest of all the machines tested is the Atari 800 (and identical 400). On the other hand, Atari Basic has some features not found in some other Basic interpreters which may partially make up for its leisurely performance.

Additional Entries

In updates of this chart, we would like to include as many computers as possible. We would be pleased to receive benchmark results from readers who have machines that we have not listed. We would be especially interested to include the results of the test on minicomputers and mainframes. Be sure to use an accurate stopwatch for timing. Alternatively, if your computer has a real-time clock, as the NEC 8201 does, it can be used. ☐

Benchmark Test Results

Computer	Time	Accuracy	Random
Olivetti M20	0:13	.0114136	6.2
Computer Devices DOT	0:22	.005859375	7.1
IBM PC	0:24	.01159668	6.3
GCE Vectrex	0.33	.0753174	0.9
Laser 2001	0:40	.0003272295	17.4
Panasonic JR200	0:57	.00021481514	15.1
Mattel Aquarius	1:17	.187805	10.0
NEC PC-8201	1:44	.187805	9.3
Vic 20	1:49	.0010414235	23.7
Commodore 64	1:53	.0010414235	8.9
Apple II Plus	1:53	.0010414235	12.0
Apple IIe	1:53	.0010414235	12.0
TRS-80 Model III	1:59	.0338745	5.8
Micro Color Computer	1:59	.000596284867	7.6
Atari 2600 Graduate	2:15	.000224679708	7.9
Color Computer	2:23	.000596284867	7.3
Epson HX-20	2:36	.0338745	23.8
SpectraVideo 318/328	3:40	.0000002058	12.4
TRS-80 Model 100	4:54	.0000002058	12.4
Casio FP-200	5:05	.00723	30.3
TI CC-40	5:41	.00000011	6.2
Atari 800	6:48	.012959	22.8

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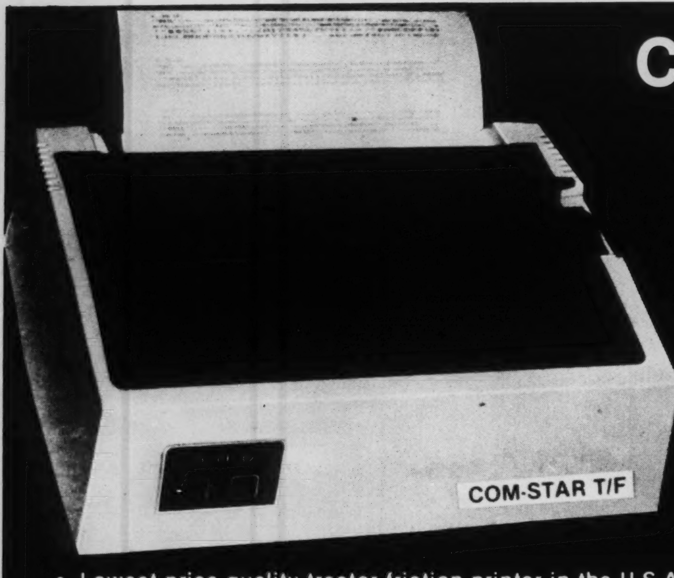

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Easy Plotting on the TRS-80 Model 100 and NEC 8201

David H. Ahl

Do you want a simple program to show off your new TRS-80 Model 100 or NEC PC-8201? Would you like to learn easily how pixel addressing works? Or would you like to explore some mathematical functions without doing any calculations and hand work?

If you answered "yes" to any of these questions, then key in this short 27-line program on your Model 100 or 8201 and have some fun while you learn.

Plot Any Function

Programs to plot any function have been around for 15 years or so, but many of them are oriented to hard copy listings in which the x-axis runs in the vertical direction of the paper feed on the printer. For computers without the ability to address individual screen locations easily, these programs are still quite useful.

However, when a computer offers pixel addressing by means of a PSET, LOCATE, or PLOT command, it seems that one ought to take advantage of this capability and orient plots so that the x-axis is horizontal.

This program is one of 50 programs that appear in my new series of Ideabooks for seven different computers. It started off as a conversion of a plot-any-function program that I wrote in 1971, but wound up bearing very little resemblance to the original.

Fitting The Plot On The Screen

The screen on the Model 100 and 8201 is 240 pixels in width by 64 pixels high (see Figure 1). The standard computer

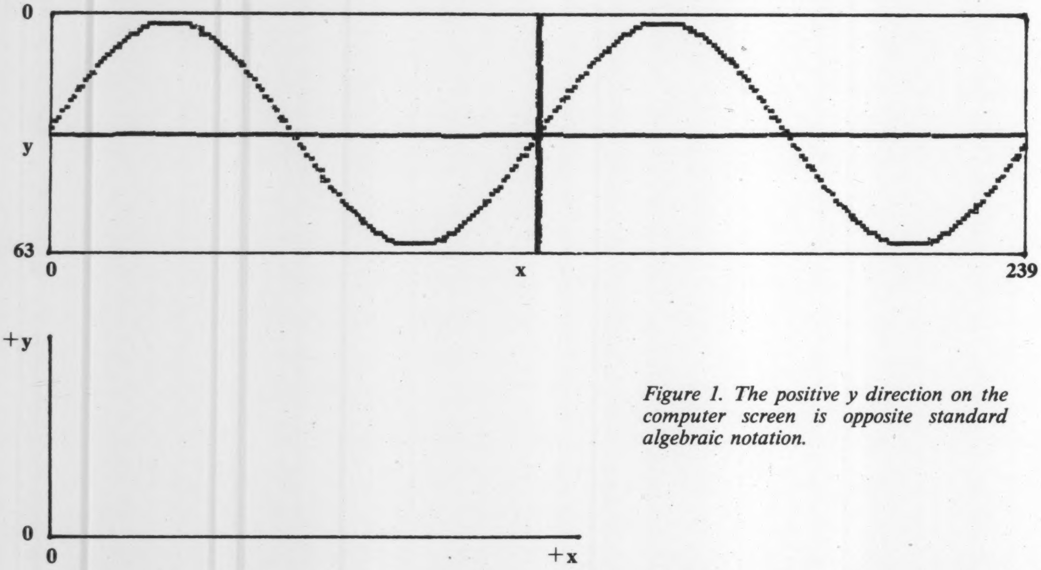

Figure 1. The positive y direction on the computer screen is opposite standard algebraic notation.

convention for numbering the pixels in the vertical direction is from the top to the bottom, just the opposite of what you learned in algebra and geometry. Hence, we are faced with two problems in plotting a function: scaling it to fit on the screen (240 × 64) and orienting it "correctly" (bottom to top).

Since the x-direction has far more pixels than the y-direction, 240 vs. 64, it seems sensible to plot every point in the x-direction and let the y points fall where they may. As we will see later, this is not always satisfactory, but for the most part this approach produces acceptable results.

Although we will have the computer do some of the scaling, we will allow the user to specify upper and lower limits for the values of x and y (inputs in lines 30 and 40). Scaling in the x-direction takes place in lines 50 and 60. DX is the distance between the upper limit (XU) and lower limit (XL) of x values. This distance, DX, is then divided by the 240 horizontal pixels to produce a horizontal scaling factor which is also used as a horizontal step (SP).

This horizontal step, SP, when used in the FOR loop starting in line 100, produces 240 equal steps between the lower and upper limits of x.

A similar scaling factor for the y-direction (SY) is computed in lines 70 and 80.

Line 90 simply clears the screen and causes the label line at the bottom to disappear. We are then ready to enter the function plot loop between lines 100 and 160.

Each x-value to be plotted (XP) is computed in line 110. If all our plots started with a lower limit of 0, the plotted x-value would be simply the actual x-value divided by the scaling factor. However, to allow for plots that start above or below 0, the lower limit of x (XL) must be subtracted from the actual x-value and the result divided by the scaling factor.

The function we wish to plot is stated in line 120 in the form, y equals any function of x. Several examples are given later.

In line 130, the y-value to be plotted (YP) is calculated. To compensate for the computer screen pixels being numbered from top to bottom instead of bottom to top, the computed value is subtracted from 64. This effectively inverts the plot.

```
10 CLS:PRINT "Plot any function. Define"
20 PRINT "function in Line 120."
30 INPUT "Lower & upper X limits";XL,XU
40 INPUT "Lower & upper Y limits";YL,YU
50 DX=XU-XL
60 SP=DX/240
70 DY=YU-YL
80 SY=DY/64
90 CLS:SCREEN 0,0
100 FOR X=XL TO XU STEP SP
110 XP=(X-XL)/SP
120 Y=(10/X)*SIN(X)
130 YP=64-((Y-YL)/SY)
140 IF YP<0 THEN YP=0
150 PSET (XP,YP)
160 NEXT X
170 IF SGN(XU)=SGN(XL) THEN 220
180 XA=-XL/SP
190 FOR Y=0 TO 63
200 PSET (XA,Y)
210 NEXT Y
220 IF SGN(YU)=SGN(YL) THEN 270
230 YA=64+YL/SY
240 FOR X=0 TO 239
250 PSET (X,YA)
260 NEXT X
270 GOTO 270
```

The PSET (XP,YP) statement in line 150 turns on the LCD pixel at x-coordinate XP and y-coordinate YP. Since we allow the user to specify the upper and lower limits of both x and y, it may happen that one or more y-values are outside of the dimensions of the screen. The x-values, of course, cannot be off the screen since we are using XL and XU as the right and left edges of the plot.

Y-values that exceed the screen dimensions by a small amount should be plotted as the top or bottom line of the screen instead of having the program halt with an error message. Hence, line 140 converts negative plot values (above the top of the screen) into a zero (top row of pixels). In the positive (lower) direction, the Basic language is somewhat forgiving and accepts y-values up to 255, but plots them as though they were 63 (bottom row of pixels).

Line 170 tests whether the y-axis is on the screen by checking if the lower and upper limits of x are the same sign. If the axis is on the screen, line 180 determines where it is; it is then plotted in lines 190 to 210. The same calculations and plot are performed for the x-axis in lines 220 to 260.

Line 270 simply keeps the program in a loop so the plot stays on the screen until the program is interrupted by pressing the BREAK key on the Model 100 or the STOP key on the NEC 8201.

What To Plot?

This program will plot any function that can be specified in terms that can be interpreted by the Basic language. In the program, this is done in line 120. Although relatively few functions are directly implemented in Basic, virtually any function can be represented by combinations of the Basic functions. For example, if you are interested in inverse hyperbolic functions, you will have to translate them into functions which are implemented in the Basic language.

This, incidentally, is not as difficult as it may sound. Many reference books and computer manuals have tables of derived functions. For example,

Cosecant = 1/SIN(X)
Hyperbolic Cosecant = 2/(EXP(X)−EXP(−X))
Inverse Hyperbolic Cosecant =
LOG ((SGN (X) *SQR(X*X+1)+1)/X)

Some of these derived functions are quite intriguing and may pique your curiosity. For example, try plotting some Bessel functions or Laplace transforms.

On the other hand, you can learn a great deal from experimenting with other, straightforward functions, while producing some fascinating displays. Here are some functions that work well:

Function	X limits		Y limits	
Y=30*EXP(-X*X/100)	-25	25	0	30
Y=SIN(X)	-6.28	6.28	-1	1
Y=SIN(X)	0	314	-1	1
Y=X↑2-15	-6	6	-20	30
Y=-X↑2+X+20	-7	8	-38	22
Y=EXP(SIN(X))	-6.28	6.28	0	3
Y=(10/X)*SIN(X)	2	24	-2.5	5
Y=(10/X)*SIN(X)	-12	12	-2.5	10
Y=3*SIN(X)+X	-12.6	12.6	-15	15

For best results, the limits of trigonometric functions are generally multiples of pi (3.14159). Limits for other functions are best found by experimentation.

This list of functions barely scratches the surface of possibilities. You will find that some functions produce problems in the program. For example, a function that has x in the denomi-

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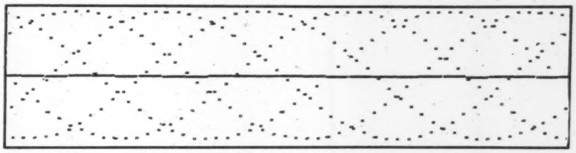
Easy Plotting, continued...

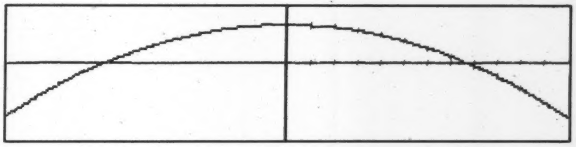
nator will cause a divide-by-zero error if x is zero. Why, then, doesn't the last equation fail since x passes through zero? Because the way the steps occur, the expression is evaluated just below and just above zero; with other limits it might possibly blow up.

The second suggested set of limits for the sine curve (0 and 314) produces an interesting plot. Since 314 is more than the number of horizontal divisions (240), the plot "misses" many critical values. As a result, the ten normal sine curves that should appear between 0 and 314 (pi times ten), appear to be ten interlocking and overlapping sine waves, each one exactly 2½ normal periods in length. Can you explain this phenomenon? Incidentally, the plot can be improved slightly by making the lower and upper y limits, −1.1 and 1.1. You will find this is often true, i.e., slight variations in the limits of x and y produce more (or less) pleasing plots.

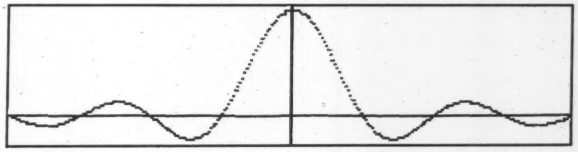
This type of curve, in which a great deal is happening in the y direction relative to the x direction, illustrates the problem mentioned earlier. You will recall that we said that, "since the x-direction has far more pixels than the y-direction, 240 vs. 64, it seems sensible to plot every point in the x-direction and let the y points fall where they may." It should now be obvious that this may not always produce the best possible plot because of many missing vertical points. For most plots, however, we feel justified in sticking with our first decision of plotting 240 horizontal points.



Y=SIN(X) 0 314 -1 1



Y=X↑2-15 -6 6 -20 30



Y=(10/X)*SIN(X) -12 12 -2.5 10

Making All Plots Fit

It is possible to add a routine to the program to make all plots fit within the y screen dimensions. First, we must eliminate line 40 asking for the upper and lower limits of y. Instead, we must write a routine to insert between lines 60 and 70 to evaluate y over the entire range of values for x, saving the maximum and minimum values. These two values then become the lower limit (YL) and upper limit (YU) of y. We leave it to the reader to write this routine. Hint: it can be done in five lines.

This program can be "cleaned up" in other ways. Nevertheless, in its present form, you should find it educational, interesting, and entertaining. ☐

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S-100 MEMORY BOARDS

64K STATIC RAM - Jade

Uses new 2K x 8 static RAMs, fully supports IEEE 696 24 bit extended addressing, 200ns RAMs, lower 32K or entire board phantomable, 2716 EPROMs may be subbed for RAMs, any 2K segment of upper 8K may be disabled, low power typically less than 500ma.

MEM-99152B	*Bare board*	$49.95
MEM-99152K	*Kit less RAM*	**$99.95**
MEM-32152K	*32K kit*	**$199.95**
MEM-56152K	*56K kit*	**$289.95**
MEM-64152K	*64K kit*	**$299.95**
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256 RAMDISK - SD Systems

ExpandoRAM III expandable from 64K to 256K using 64 x 1 RAM chips, compatible with CP/M, Oasis, & most other Z-80 based systems, functions as ultra-high speed disk drive when used with optional RAMDISK software

MEM-65064A	*64K A & T*	**$474.95**
MEM-65128A	*128K A & T*	**$574.95**
MEM-65192A	*192K A & T*	**$674.95**
MEM-65256A	*256K A & T*	**$774.95**
SFC-55009000F	*RAMDISK sftwr CP/M 2.2*	**$44.95**
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PRA-52000	*Tractor option*	**$159.95**

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PRD-11300	*380Z printer*	**$1295.00**
PRA-11000	*Tracor option*	**$169.95**
PRA-12000	*Cut Sheet Feeder*	**$699.95**

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OKIDATA 2350	*15" 350 CPS*	**CALL**
OKIDATA 2410	*15" 350 CPS*	**CALL**
DAISYWRITER 2000	*48K Daisywheel*	**$1395.00**
GEMINI 10	*100 CPS With Graphics*	**$349.95**
GEMINI 15	*15" With Graphics*	**$499.95**
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DUAL DISK SUB SYSTEMS

Disk Sub-Systems - Jade

Handsome metal cabinet with proportional balanced air flow system, rugged dual drive power supply, power cable kit, power switch, line cord, fuse holder, cooling fan, nevermar rubber feet, all necessary hardware to mount 2-8" disk drives, power supply, and fan, does not include signal cable.

Dual 8" Sub-Assembly Cabinent

END-000420	*Bare cabinent*	**$49.95**
END-000421	*Cabinent kit*	**$199.95**
END-000431	*A & T*	**$249.95**

8" Sub-Systems - Single Sided, Double Density

END-000423	*Kit w/2 Siemens FD100-8Ds*	**$650.00**
END-000424	*A & T w/2 Siemens FD100-8Ds*	**$695.00**
END-000433	*Kit w/2 Shugart SA-801Rs*	**$999.95**
END-000434	*A & T w/2 Shugart SA-801Rs*	**$1195.00**

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END-000426	*Kit w/2 Qume DT-8s*	**$1224.95**
END-000427	*A & T w/2 Qume D-8s*	**$1424.95**
END-000436	*Kit w/2 Shugart SA-851Rs*	**$1274.95**
END-000437	*A & T w/2 Shugart SA-851Rs*	**$1474.95**

8" SLIMLINE SUB-SYSTEMS

Dual Slimline Sub-Systems - Jade

Handsome vertical cabinet with scratch resistant baked enamel finish, proportionally balanced air flow system, quiet cooling fan, rugged dual drive power supply, power cables, power switch, line cord, fuse holder, colling fan, all necessary hardware to mount 2-8" slimline disk drives, does not include signal cable

Dual 8" Slimline Cabinet

END-000820	*Bare cabinet*	**$59.95**
END-000822	*A & T w/o drives*	**$179.95**

Dual 8" Slimline Sub-Systems

END-000823	*Kit w/2 SS DD*	**$919.95**
END-000824	*A & T w/2 SS DD*	**$949.95**
END-000833	*Kit w/2 DS DD*	**$1149.95**
END-000834	*A & T w/2 DS DD*	**$1179.95**

S-100 CPU BOARDS

SBC-200 - SD Systems

4 MHz Z-80A CPU with serial & parallel I/O, 1K RAM, 8K ROM space, monitor PROM included.

CPU-30200A	*A & T*	**$329.95**

THE BIG Z - Jade

2 or 4 MHz switachable Z-80 CPU board with serial I/O, accommodates 2798, 2716, or 2732 EPROM, baud rates from75 to 9600.

CPU-30201B	*Bare board w/manual*	**$35.00**
CPU-30201K	*Kit with Manual*	**$149.95**
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2810 Z-80 CPU - C.C.S.

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VDM-751210	*12" Amber*	**$139.95**

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Tandon TM100-1 single-sided double-density 48 TPI	**MSM-551001**	**$219.95 ea**	2 for **$199.95 ea**
Shugart SA400L single-sided double-density 40 track	**MSM-104000**	**$234.95 ea**	2 for **$224.95 ea**
Tandon TM100-2 double-sided double-density 48 TPI	**MSM-551002**	**$294.95 ea**	2 for **$269.95**
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MBS-061K	*Kit*	**$39.95**
MBS-061A	*A & T*	**$69.95**
	12 Slot (9¾" x 8⅝")	
MBS-121B	*Bare board*	**$34.95**
MBS-121K	*Kit*	**$69.95**
MBS-121A	*A & T*	**$109.95**
	18 Slot (14½" x 8⅝")	
MBS-181B	*Bare board*	**$54.95**
MBS-181K	*Kit*	**$99.95**
MBS-181A	*A & T*	**$149.95**

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Siemens FDD 100-8 single-sided double-density	**MSF-201120**	**$274.95 ea**	2 for **$249.95 ea**
Shugart SA801R single-sided double-density	**MSF-10801R**	**$394.95 ea**	2 for **$389.95 ea**
Shugart SA851R double-sided double density	**MSF-10851R**	**$554.95 ea**	2 for **$529.95 ea**
Qume DT-8 double-sided double-density	**MSF-750080**	**$524.95 ea**	2 for **$498.95 ea**
Tandon TM8481 single-sided double-den thin-line	**MSF-558481**	**$379.96 ea**	2 for **$369.95 ea**
Tandon TM848-2 double-sided double-den thin-line	**MSF-558482**	**$494.95 ea**	2 for **$484.95**
NEC FD1165 double-sided double-den thin-line	**MSF-851165**	**$484.95 ea**	2 for **$449.95**

S-100 I/O BOARDS

THE BUS PROBE - Jade

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IOI-1830C	*CSC*	**$414.95**

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IOI-1010A	*A & T*	**$249.95**

I/O-5 - SSM Microcomputer

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IOM-5620A	*1200/300 baud Deluxe*	**$369.95**
IOM-5650A	*300 baud for Osborne*	**$119.95**
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IOM-2012A	*Terminal program for MMII*	**$89.95**

1200 Baud SMART CAT - Novation

103/212 Smart Cat & 103 Smart Cat 1200 & 300 baud, built-in dialer, auto re-dial if busy, auto answer disconnect direct conect, LED readout displays mode, analog digital loopback self tests, usaable with multi-line phones

IOM-5241A	*300 baud 103 Smart Cat*	**$229.95**
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1/5 the size of ordinary modems, Bell 103, manual or auto-answer, automatic answer/orginate, direct connect, built-in self-test, two LEDs and audio beeps provide status information.

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NEW! CP/M Plus 3.0

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SFC-55009057F	*Banked, RS232*	**$250.00**
SFC-55009056F	*Banked, VDB8024*	**$250.00**
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S-100 EPROM BOARDS

PB-1 - SSM Microcomputer

2708, 2716 EPROM board with on-board programmer.

MEM-99510K	*Kit with manual*	**$154.95**
MEM-99510A	*A & T With Manual*	**$219.95**

PROM-100 - SD Systems

2708, 2716, 2732 EPROM programmer with software.

MEM-99520K	*Kit With software*	**$189.95**
MEM-99520A	*A & T With software*	**$249.95**

S-100 DISK CONTROLLERS

VERSAFLOPPY II - SD Systems

Double density disk controller for any combination of 5¼" and 8" single or double sided, analog phase-locked loop data seperator, vectored interrupts. CP/M 2.2 & Oasis compatible control/diagnostic software PROM included.

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IOD-1200A	*A & T w/hdwr 7 sftwr man*	**$325.95**
SFC-59002001F	*CP/M 2.2 With Double D*	**$99.95**

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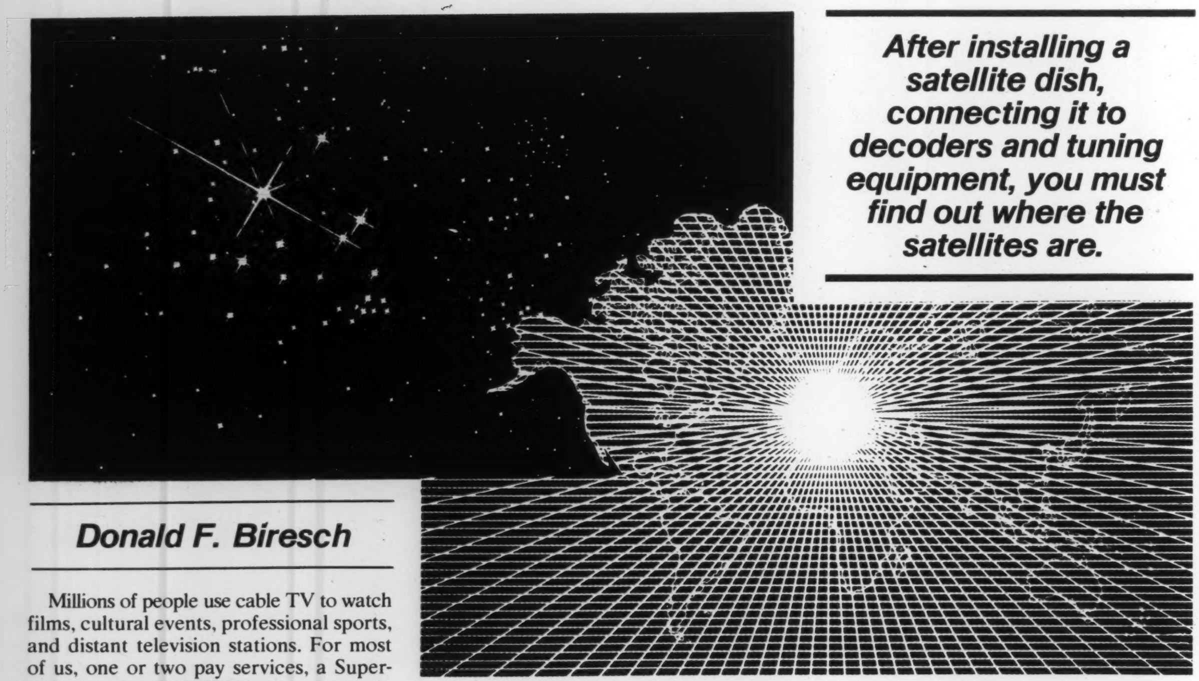
Setting Up A Private Ground Station

The Satellites Are Out Tonight



After installing a satellite dish, connecting it to decoders and tuning equipment, you must find out where the satellites are.

Donald F. Biresch

Millions of people use cable TV to watch films, cultural events, professional sports, and distant television stations. For most of us, one or two pay services, a Superstation, and maybe MTV is about as exotic as we'll ever get. A few people are using private ground stations to receive the same services in addition to signals from other sources, sent through geosynchronous satellites. They are called geosynchronous because they revolve at the same rate as the Earth, appearing to stay in one location. Lock onto one satellite and the signals are available for your viewing.

What extras can you pick up? Some network programs are fed to affiliates earlier than the scheduled airtime. News organizations use satellite communications to transmit and receive news reports from distant locations, so it is possible to pick up a late-breaking news story before airtime. Suppose your favorite football team blacks out home games; with a satellite dish, you can watch the game. The legal aspects of tuning into signals are unclear, and viewing for private, home use is thought to be safe, but check current FCC regulations regarding the interception of private signals to be sure.

Satellite dishes and the connecting equipment are expensive, with costs running in the thousands of dollars. After installing a satellite dish, connecting it to decoders and tuning equipment, you must find out where the satellites are. This is often the most difficult part of hooking up with a "bird."

Guides as to the general location of satellites are available, but they give only a general idea of the location of a given satellite. What you need is a way of personalizing the search for the area where you live. Since the values used are constant—azimuth and elevation angles for the satellites, and the location of the receiving station—all you need to do is make the correct calculations. Why not use your computer to help you? Just enter the proper values, and the correct location of a satellite will be shown.

The Geosynchronous Satellite Locator Program

Geosynchronous Satellite Locator was written for an Atari 800 with one disk drive, Atari Basic, and an optional Epson printer.

The program automatically computes azimuth and elevation angles for geosynchronous satellites. The program will work for any geosynchronous bird as long as its longitude and height above its subpoint are known.

Donald F. Biresch, Tabor Rd., Ottsville, PA 18942.

Using The Program

All necessary data except the earth station coordinates are included in the program for the satellites currently in orbit in the Clark Belt. The program automatically compensates for the hemisphere in which the earth station is located.

All input is via the keyboard. All angular data are requested in degrees. However, it would be a trivial task to allow input in radians. Distances have been (at the user's option) permitted in miles or kilometers.

Although the program provides for hardcopy, this feature is user selectable at run time. Therefore, a printer is not necessary to use the program.

The program is self prompting, and since it is written in Basic, it is pretty well self documented. The equations used in the program can be found in most books on advanced trigonometry.

A sample printout for my location is included as an example. Both kilometers and miles are demonstrated.

Please note that the geosynchronous satellites are a very special and very simplified subset of the satellite community. This program will not work for orbiting satellites (such as oscar), since these require a moving antenna to maintain contact. The equations for such satellites are considerably more complicated, and their solutions are of little consequence to the average homeowner.

I created this program to simplify the task of establishing a site for my earth station dish.

In using the data derived from this program, it is important to remember that all azimuth angles are true (not magnetic) north. Consult an aviation sectional chart to determine the variation for your area. Westerly magnetic variation is added, and easterly variation is subtracted. If in doubt, any pilot will be able to provide guidance. Generally, here on the East Coast we add westerly variation.

With this program, a good quality compass, and an inclinometer (or better yet, a transit), you can accurately determine your window to the Clark Belt satellites. Accurate determination is now even more important since the FCC has approved 2 degree spacing for the geostationary satellites in this belt. Those with 10' or smaller dishes may notice rather severe interference as this new close spacing takes effect.

Changes For Other Computers

Since Atari Basic is a subset of most more comprehensive interpreters, the program should be easily adaptable to most home computers. If the trig and inverse trig functions are not available on your machine, series expansions work quite well for the arccos, arctan, and arccot functions. However, they will slow down execution time considerably.

I have refrained from using the extensive graphics capabilities of the Atari, since these functions would not easily transfer to other micros. The special printer codes used throughout are specifically for the Epson MX80-FT. They will, no doubt, have to be modified for other machines.

For certain satellites an error message may be generated to indicate that the bird is not visible from the earth station. In general, for great circle angles between the ground station and the satellite subpoint (the point on the earth directly below the satellite) which are greater in absolute value than 81.3 degrees the satellite will not be visible. □

Geosynchronous Satellite Locator sample run.

```
EARTH STATION AT OTTSVILLE,PA:
LATITUDE = 40.5 DEGREES (-=SOUTH), LONGITUDE = -75.17 DEGREES (-=WEST)


SATELLITE: SATCOM F1, LONGITUDE = -135 DEGREES (-=WEST)

ELEVATION ANGLE = 14.04276086 DEG
AZIMUTH ANGLE = 249.316838 DEG
SLANT RANGE = 24959.1254 MILES


SATELLITE: SATCOM F3, LONGITUDE = -131 DEGREES (-=WEST)

ELEVATION ANGLE = 16.97783841 DEG
AZIMUTH ANGLE = 246.208876 DEG
SLANT RANGE = 24771.7937 MILES


SATELLITE: WESTAR 5, LONGITUDE = -123 DEGREES (-=WEST)

ELEVATION ANGLE = 22.68684451 DEG
AZIMUTH ANGLE = 239.533225 DEG
SLANT RANGE = 24420.2185 MILES


SATELLITE: SATCOM F2, LONGITUDE = -119 DEGREES (-=WEST)

ELEVATION ANGLE = 25.42906223 DEG
AZIMUTH ANGLE = 235.920519 DEG
SLANT RANGE = 24258.0464 MILES


SATELLITE: ANIK C3, LONGITUDE = -117.5 DEGREES (-=WEST)

ELEVATION ANGLE = 26.4327625 DEG
AZIMUTH ANGLE = 234.511747 DEG
SLANT RANGE = 24199.8629 MILES


SATELLITE: ANIK A3/A2, LONGITUDE = -114 DEGREES (-=WEST)

ELEVATION ANGLE = 28.71383511 DEG
AZIMUTH ANGLE = 231.100462 DEG
SLANT RANGE = 24070.076 MILES


SATELLITE: ANIK B, LONGITUDE = -109 DEGREES (-=WEST)

ELEVATION ANGLE = 31.79863339 DEG
AZIMUTH ANGLE = 225.90093 DEG
SLANT RANGE = 23900.1914 MILES
```

Geosynchronous Satellite Locator listing.

```
5 GRAPHICS 0
6 DIM W$(1),TOWN$(30),SAT$(15)
8 J1=0:J2=0:DEG :K1=0
10 POSITION 0,0:PRINT "     GEOSYNCHRONOUS SATELLITE LOCATOR   "
15 PRINT "    COPYRIGHT 1983 BY DON BIRESCH":PRINT "          ALL RIGHTS RESERVED
"
20 PRINT :PRINT "THIS PROGRAM AUTOMATICALLY COMPUTES ":PRINT "AZIMUTH AND ELEVAT
ION ANGLES FOR";
25 PRINT " GEO- SYNCHRONOUS SATELLITES FOR ALL LOCAT-":PRINT "IONS ON THE EARTH"
30 PRINT :PRINT "THE LATITUDE AND LONGITUDE OF THE"
32 PRINT "EARTH STATION LOCATION MUST BE":PRINT "KNOWN, AS WELL AS THE LONGITUDE
 OF"
35 PRINT "THE SATELLITE SUBPOINT."
39 PRINT :PRINT "ALL POSITIONS ARE ENTERED IN DEGREES"
40 PRINT "(NORTH LATITUDES ARE +, SOUTH ARE -)"
45 PRINT "(EAST LONGITUDES ARE +, WEST ARE -)":PRINT
50 PRINT "IF LOCAL MAGNETIC VARIATION IS KNOWN":PRINT "COMPASS HEADINGS ARE PROV
IDED.":PRINT
70 PRINT "HIT 'RETURN' TO CONTINUE";
75 TRAP 75:INPUT W$
77 GRAPHICS 0:POSITION 0,0:PRINT "     GEOSYNCHRONOUS SATELLITE LOCATOR   "
80 PRINT "LONGITUDES OF THE SATELLITES IN THE "
90 PRINT "CLARK BELT:"
```

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CIRCLE 167 ON READER SERVICE CARD

Satellites, continued...

```
92 PRINT "  SATCOM F5          143 DEG WEST":PRINT "  SATCOM F1R        139 DEG WES
T"
95 PRINT "  GALAXY G1          134 DEG WEST":PRINT "  SATCOM F3         131 DEG WES
T"
96 PRINT "  COMSTAR D4         127 DEG WEST"
100 PRINT "  WESTAR 5           123 DEG WEST":PRINT "  SATCOM F2         119 DEG WE
ST"
106 PRINT "  ANIK A3            114 DEG WEST":PRINT "  ANIK A2           112 DEG WE
ST"
110 PRINT "  ANIK B (AB)        109 DEG WEST":PRINT "  ANIK D (AD1)      104.5 DEG
WEST"
115 PRINT "  WESTAR W4          99 DEG WEST":PRINT "  COMSTAR D2        95 DEG WEST
"
120 PRINT "  WESTAR W3          91 DEG WEST":PRINT "  COMSTAR D3        87 DEG WEST
"
125 PRINT "  SATCOM F4          83 DEG WEST":PRINT "  WESTAR W2         79 DEG WEST
"
127 PRINT "  WESTAR W6          78.5 DEG WEST":PRINT "  GALAXY G2         74 DEG WE
ST"
130 PRINT "  SATCOM F2R         72 DEG WEST":PRINT "  SPACENET S2       70 DEG WEST
"
135 PRINT "HIT 'RETURN' TO CONTINUE";
140 TRAP 140:INPUT W$
145 GRAPHICS 0:POSITION 0,0:PRINT "     GEOSYNCHRONOUS SATELLITE LOCATOR   "
146 PRINT :PRINT "MILES(1) OR KILOMETERS(0)";:TRAP 146:INPUT M
150 PRINT :PRINT "ENTER EARTH STATION NAME(MAX.30 CHAR.)"
155 TRAP 155:INPUT TOWN$:PRINT :PRINT
156 PRINT "ENTER EARTH STATION MAGNETIC VARIATION(+=WEST,-=EAST)";:PRINT "IF NOT
 KNOWN ENTER '99'";
157 TRAP 157:INPUT VAR:PRINT
158 IF VAR<>99 THEN 160
159 K1=1
160 PRINT "ENTER EARTH STATION LATITUDE(DEGREES)":PRINT "(NORTH=+, SOUTH=-)";
162 TRAP 162:INPUT LA:PRINT
164 PRINT "ENTER EARTH STATION LONGITUDE(DEGREES)":PRINT "(EAST=+, WEST=-)";
165 TRAP 165:INPUT LO:PRINT
166 PRINT "WANT CLARK BELT PRINTOUT(1=YES, 0=NO)";
167 TRAP 167:INPUT Z:IF Z=1 THEN GOTO 990
168 PRINT :PRINT "ENTER SATELLITE NAME"
169 TRAP 169:INPUT SAT$:IF J2<>0 THEN 180
170 PRINT :PRINT "ENTER SATELLITE LONGITUDE":PRINT "(EAST=+, WEST=-)";
175 TRAP 175:INPUT SL
178 REM BEGIN CALCULATIONS
180 B=LO-SL
190 IF ABS(B)<=180 THEN 198
194 IF B>180 THEN B=B-360
196 IF B<(-180) THEN B=B+360
198 Y=COS(B)*COS(LA)
200 C=-ATN(Y/SQR(-Y*Y+1))+90
203 IF ABS(C)<81.3 THEN 210:REM SATELLITE BELOW HORIZON AND NOT VISIBLE
205 PRINT :PRINT "SATELLITE BELOW HORIZON FOR THIS STATION"
206 PRINT " NO WINDOW EXISTS"
210 TANB=SIN(B)/COS(B)
214 REM CALCULATE AZIMUTH(TRUE HEADING OF SATELLITE)
215 IF LA>=0 THEN 220:REM NORTH HEMISPHERE
218 A=ATN(TANB/SIN(LA)):REM SOUTHERN HEMISPHERE
219 GOTO 225
220 A=180+ATN(TANB/SIN(LA))
225 IF J1=1 THEN 250
234 IF M=0 THEN 245:REM METERS
240 H=22245:R=3957:GOTO 250:REM SATELLITE HEIGHT ABOVE EARTH AND RADIUS OF EARTH
(IN MILES)
245 R=6367:H=35800:REM IN METERS
250 S=SQR(R*R+(R+H)*(R+H)-2*R*(R+H)*COS(C)):REM SLANT RANGE
258 X=(S*S+R*R-(R+H)*(R+H))/(2*R*S)
259 REM CALCULATE ELEVATION ANGLE
260 E=-ATN(X/SQR(-X*X+1))
270 PRINT :PRINT "ELEVATION ANGLE = ";E;" DEG"
280 PRINT "AZIMUTH ANGLE = ";A;" DEG"
281 IF K1<>1 THEN 283:REM CALCULATE COMPASS HEADING=TRUE HEADING +(WESTERLY) OR
-(EASTERLY) LOCAL MAG.VAR.
282 PRINT "COMPASS HEADING NOT AVAILABLE":GOTO 284
283 PRINT "MAGNETIC HEADING = ";A+VAR;" DEG"
284 IF M=0 THEN PRINT "SLANT RANGE = ";S;" KILOMETERS":GOTO 292
290 PRINT "SLANT RANGE = ";S;" MILES"
292 IF J2<>0 THEN 320
300 PRINT :PRINT "HARD COPY (1=YES, 0=NO)";
310 TRAP 310:INPUT Z:IF Z<>1 THEN 350
320 IF J1=0 THEN 400
330 LPRINT :GOTO 408
350 PRINT :PRINT "GO AGAIN WITH NEW SAT. DATA (1=YES, 0=NO)";
360 TRAP 360:INPUT Z:IF Z=1 THEN 168
365 PRINT "RERUN PROGRAM FROM BEGINNING (1=YES, 0=NO)";
366 TRAP 366:INPUT Z:IF Z<>1 THEN 370
367 GRAPHICS 0
368 IF J1=0 THEN GOTO 8
369 LPRINT CHR$(12):GOTO 8
370 DOS
380 END
399 REM HARDCOPY ROUTINE
400 TRAP 500:LPRINT CHR$(27);CHR$(78);CHR$(4);CHR$(14);"   GEOSYNCHRONOUS SATELL
ITE LOCATOR"
401 LPRINT CHR$(20);:LPRINT :LPRINT
402 LPRINT "EARTH STATION AT ";TOWN$;":"
403 LPRINT "MAGNETIC VARIATION = ";VAR;" DEG"
```

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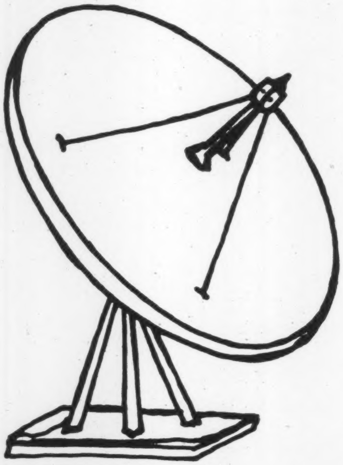
CIRCLE 120 ON READER SERVICE CARD

Satellites, continued...

```
405 LPRINT "LATITUDE = ";LA;" DEGREES (-=SOUTH), LONGITUDE = ";LO;" DEGREES (-=W
EST)":LPRINT
408 LPRINT :LPRINT "SATELLITE: ";SAT$;", LONGITUDE = ";SL;" DEGREES (-=WEST)"
415 IF ABS(C)<81.3 THEN 450
416 LPRINT "SATELLITE BELOW HORIZON FOR THIS STATION-RECEPTION IS IMPOSSIBLE"
450 LPRINT :LPRINT "ELEVATION ANGLE = ";E;" DEG"
460 LPRINT "AZIMUTH ANGLE = ";A;" DEG"
461 IF K1<>1 THEN 463
462 LPRINT "COMPASS HEADING NOT AVAILABLE-VARIATION NOT KNOWN":GOTO 465
463 LPRINT "COMPASS HEADING = ";A+VAR;" DEG"
465 IF M=0 THEN LPRINT "SLANT RANGE = ";S;" KILOMETERS":GOTO 480
470 LPRINT "SLANT RANGE = ";S;" MILES"
480 J1=1:TRAP 500
485 IF J2=0 THEN GOTO 350
486 IF (1000+J2)>1200 THEN 2020:REM DONE WITH CLARK BELT PRINTOUT
487 GOTO 1000+J2
500 TRAP 500:PRINT "PRINTER NOT ONLINE-HIT'RETURN' TO CONT.":INPUT W$
510 IF J1=0 THEN 400
520 TRAP 500:GOTO 408
980 TRAP 980:PRINT "TURN PRINTER ON - HIT 'RETURN'";:INPUT W$
990 TRAP 980
999 REM CLARK BELT SATELLITES-AUTO PRINTOUT
1000 SAT$="SATCOM F5":SL=(-143):GOTO 2000
1010 SAT$="SATCOM F1R":SL=(-139):GOTO 2000
1020 SAT$="GALAXY G1":SL=(-134):GOTO 2000
1030 SAT$="SATCOM F3":SL=(-131):GOTO 2000
1040 SAT$="COMSTAR D4":SL=(-127):GOTO 2000
1050 SAT$="WESTAR W5":SL=(-123):GOTO 2000
1060 SAT$="SATCOM F2":SL=(-119):GOTO 2000
1070 SAT$="ANIK A3":SL=(-114):GOTO 2000
1080 SAT$="ANIK A2":SL=(-112):GOTO 2000
1090 SAT$="ANIK AB":SL=(-109):GOTO 2000
1100 SAT$="ANIK AD1":SL=(-104.5):GOTO 2000
1110 SAT$="WESTAR W4":SL=(-99):GOTO 2000
1120 SAT$="COMSTAR D2":SL=(-95):GOTO 2000
1130 SAT$="WESTAR W3":SL=(-91):GOTO 2000
1140 SAT$="COMSTAR D3":SL=(-87):GOTO 2000
1150 SAT$="SATCOM F4":SL=(-83):GOTO 2000
1160 SAT$="WESTAR W2":SL=(-79):GOTO 2000
1170 SAT$="WESTAR W6":SL=(-78.5):GOTO 2000
1180 SAT$="GALAXY G2":SL=(-74):GOTO 2000
1190 SAT$="SATCOM F2R":SL=(-72):GOTO 2000
1200 SAT$="SPACENET S2":SL=(-70):GOTO 2000
2000 PRINT :PRINT "SATELLITE ";SAT$
2010 J2=J2+10:GOTO 180:REM RETURN TO FINISH CALCULATIONS
2020 J2=0:GOTO 350:REM FINISHED-GO AGAIN
```



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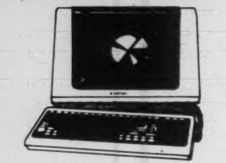

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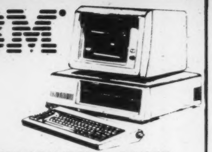

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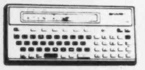

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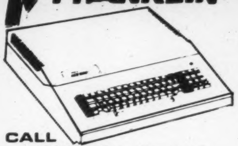

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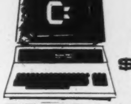

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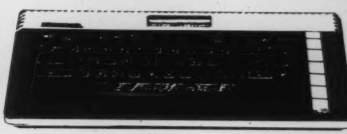

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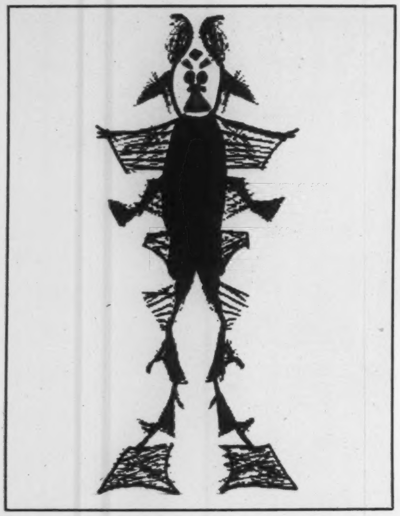

Figure 4. The Epson Monster.

Allen Munro

The Epson HX-20 notebook computer offers many impressive features, including 120×32 dot graphics. During my first few days with the HX-20, I decided to write a sheet program to produce a constantly changing graphics display on the liquid crystal display (LCD). During occasional dull moments during the annual meeting of the Linguistic Society of America, I unobtrusively entered, debugged, and modified the program while seated in a back row of one of the meeting rooms. It was an exhilarating experience to touch-type in silence on a full-size, full stroke, QWERTY keyboard without relying on a bulky monitor or access to an electrical outlet.

Figures 1 and 2 are sample screen displays from the output. These figures don't convey the charm of the program, which constantly changes the graphics display in a manner that suggests the movement of two twirling rods in three dimensions. These figures were printed using the integral Epson dot matrix printer, which considerably compresses the LCD graphics. No programming was required to produce the printed screen dumps. The user need only type CTRL PF2 to copy screen displays from the output.

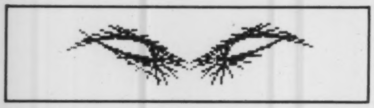

Figure 1.

Many users enjoy waiting for the screen to produce an interesting graphic, printing it, allowing the display to change to another interesting graphic, printing that, and so on. The printed tape produced is an extended graphic that takes on qualities different from the sum of its parts. Some printouts, such as that shown in Figure 3, are reminiscent of the ink-blots used in Rorschach projective tests.

The program appears in Listing 1. Lines 130 and 140 provide a randomization seed, using the day of the week and the "seconds" value of the real time clock at the time the program is run.

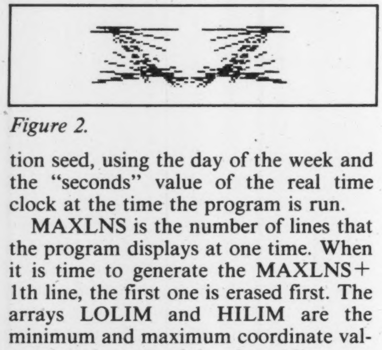

Figure 2.

MAXLNS is the number of lines that the program displays at one time. When it is time to generate the MAXLNS+1th line, the first one is erased first. The arrays LOLIM and HILIM are the minimum and maximum coordinate values that the ends of the plotted lines can take on.

The two-dimensional array ALN is an array of the coordinate values of the end points of all the lines that can be displayed at one time. The values of the coordinates of the first line are randomly selected in lines 210-240.

The main body of the program is given in lines 300 to 550. This portion repeats indefinitely, that is, until the user interrupts it with the BREAK key. The oldest line on the screen is erased, and a new line is generated. (In fact, the line has a bilaterally symmetric counterpart which is also erased, and a corresponding new line is drawn. In this discussion, these mirror-image lines are not referred to further. The instructions for their erasure and production follow immediately after the line drawing commands for the first line of the pair.) To draw a new line, its starting and ending coordinates must first be determined. This is done by adding a STEPSZ (stepsize) to each of the four values that specify the endpoints of the previous line. A given set of STEPSZ values is used for only NUMSZ times (5-20), and then a new set of STEPSZ increments for the coordinates is chosen. The subroutine in lines 570-620 is responsible for setting the four STEPSZ values and the next NUMSZ.

To appreciate how the program works in detail, type it into your HX-20 and enjoy it, then try TRACE mode to follow program flow during execution. Enjoy the graphics capabilities of the most impressive portable computer yet. □

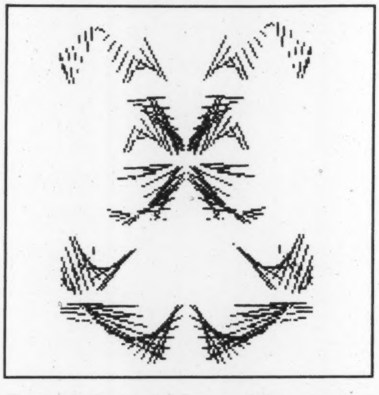

Figure 3. It can be fun to elaborate artistically on such graphics, as a friend did in Figure 4.

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CIRCLE 138 ON READER SERVICE CARD

HX-20 Graphics, continued...

Listing 1.

```
100 CLS:PRINT "  Dymamic Graphics"
110 PRINT:PRINT " Use Break to exit"
120 FOR Z=1 TO 700:NEXT Z
130 SECS=VAL(RIGHT$(TIME$,2))
140 RANDOMIZE (SECS+DAY*100)
150 '
160 MAXLNS=20
170 DIM ALN(20,4)
180 '
190 ' Initialize
200 CLS
210 ALN(0,1)=RND*60
220 ALN(0,2)=RND*32
230 ALN(0,3)=RND*60
240 ALN(0,4)=RND*32
250 '
260 HILIM(1)=59: HILIM(2)=31
270 HILIM(3)=59: HILIM(4)=31
280 '
290 ' Infinite loop from 700
300 FOR LNO=1 TO MAXLNS
310 ' Erase oldest line
320 LINE(ALN(LNO,1),ALN(LNO,2))-(ALN(LNO,3),ALN(LNO
,4)),PRESET
330 LINE(119-ALN(LNO,1),ALN(LNO,2))-(119-ALN(LNO,3)
,ALN(LNO,4)),PRESET
340 '
350 ' Pick a stepsize
360 IF NUMSZ=0 THEN GOSUB 570
370 ' Fix starting and ending points for next line
380 FOR COORD=1 TO 4
390 ALN(LNO,COORD)=ALN(LNO-1,COORD)+STPSZ(COORD)
400 IF ALN(LNO,COORD)<LOLIM(COORD) THEN ALN(LNO,COO
RD)=ALN(LNO-1,COORD):STPSZ(COORD)=STPSZ(COORD)*-1
410 IF ALN(LNO,COORD)>HILIM(COORD) THEN ALN(LNO,COO
RD)=ALN(LNO-1,COORD):STPSZ(COORD)=STPSZ(COORD)*-1
420 NEXT COORD
430 '
440 ' Draw the line
450 LINE(ALN(LNO,1),ALN(LNO,2))-(ALN(LNO,3),ALN(LNO
,4)),PSET
460 LINE(119-ALN(LNO,1),ALN(LNO,2))-(119-ALN(LNO,3)
,ALN(LNO,4)),PSET
470 NUMSZ=NUMSZ-1
480 NEXT LNO
490 '
500 ' Feed the tail of the array to its head
510 FOR COORD=1 TO 4
520 ALN(0,COORD)=ALN(MAXLNS,COORD)
530 NEXT COORD
540 ' Loop back to start of infinite loop
550 GOTO 300
560 '
570 ' Stepsize subroutine
580 NUMSZ=5*(1+RND*5)
590 FOR S1=1 TO 4
600 STPSZ(S1)=RND*10-4
610 NEXT S1
620 RETURN
```

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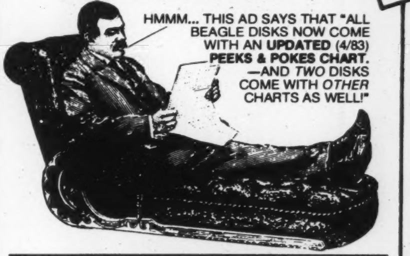
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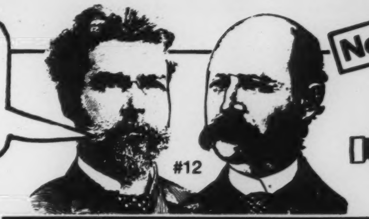

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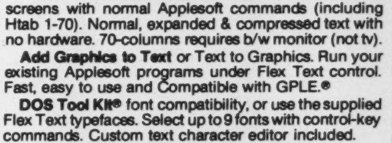

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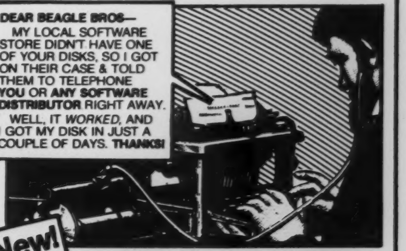
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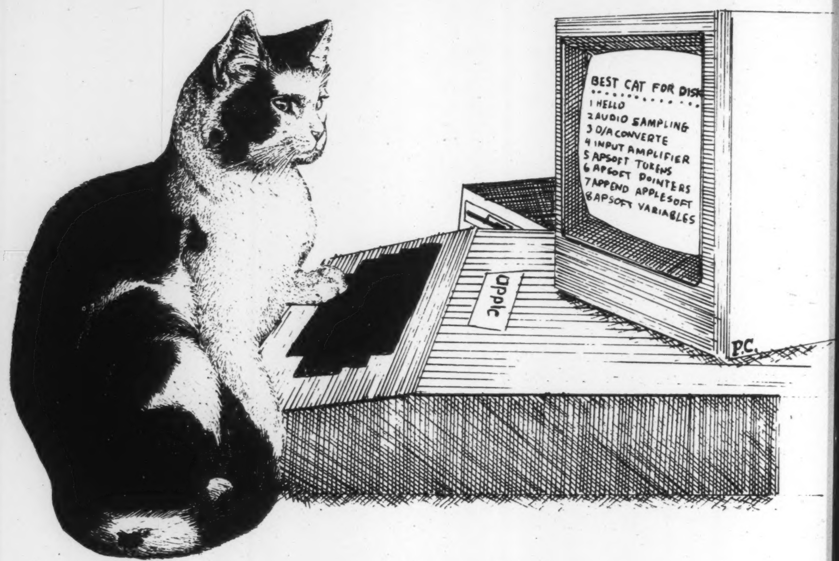
AD #12

CIRCLE 116 ON READER SERVICE CARD

Best Little Cat



Bob Bergstrom

This article will introduce the Basic programmer to simple machine language subroutine creation and use in a Basic program. It will also shed some light on the way the Apple sends text from the disk catalog to the screen. In addition, a useful disk cataloging utility is the end product.

If you are like me, you ran your Apple II with cassette storage until you could afford a disk drive. After you installed your disk system, you could load files in seconds instead of minutes—what a feeling of exhilaration. Using version 3.2 of Apple DOS allows you to store up to 84 files on each disk. And with DOS 3.3, each disk holds up to 105 files. Now your biggest problem seems to be what to do with all those cassettes.

But there can be a fly in the ointment. Suppose you catalog a disk containing 71 files in search of a file you want to load. The first 18 file names fill the screen and you spot the file you want. But before you can load the file, you must scroll the screen three times by pressing any key. After scrolling through the entire disk directory, you type LOAD plus the file name and press RETURN. But instead of loading the file, the computer emits a beep and prints FILE NOT FOUND. So you CATALOG again to find you have misspelled that cute computerese filename. If this scenario sounds familiar, you are a candidate for (drum roll please) The Best Little Cat In Alpha, Illinois.

Program Features

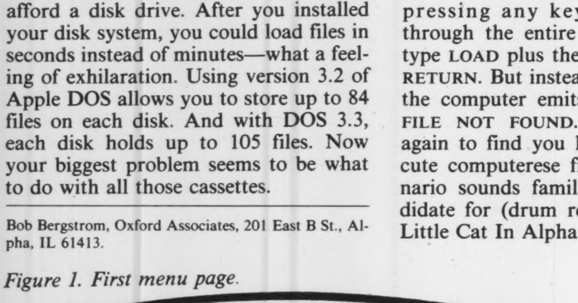
This disk menu program works equally well under version 3.2 or 3.3 DOS and is written in Applesoft Basic. Although Best Little Cat was written on an Apple with 48K of memory, it can run on a 32K machine. Among its features:

- Files are numbered from 1 to 105.
- 34 files are shown at a time.
- Files are immediately available for load or run.
- Text files are not numbered but preceded by a T.
- Disks can be accessed from drive 1 or drive 2.
- The active disk drive can be cataloged.

Figure 1 shows the first menu screen of a disk containing 34 or more files. Figure 2 shows a final menu screen.

Bob Bergstrom, Oxford Associates, 201 East B St., Alpha, IL 61413.

Figure 1. First menu page.

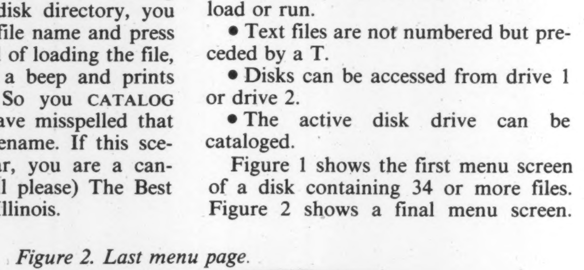


```
          BEST CAT FOR DISK VOLUME 254
   .....................................

    1 HELLO            18 HI-RES DUMP.B (I
    2 AUDIO SAMPLING   19 CHECKBOOK CHANGE
    3 D/A CONVERTER    20 APPEND SHAPES
    4 INPUT AMPLIFIER  21 CENTER TITLES
    5 GREAT HELLO PR   22 INTEGER ENTRY PT
    6 APSOFT TOKENS    23 LOWER CASE RTN
    7 APSOFT POINTERS  24 SPLIT CAT/SEC FR
    8 APPEND APPLESOFT 25 MONITOR RTN >
    9 APSOFT DIS TBL   26 MONITOR RTN ]
   10 APSOFT VARIABLES 27 TRANSPARENT
   11 OOOPS & MISC     28 LINKER
   12 HI RES COLORS    29 SCRUNCH
   13 GRAPHIC SCREEN   30 SPLIT CATALOG
   14 DISC ACCESS UTIL 31 SCRUNCH.B
   15 CAT.PATCH        32 HEX/DEC CHART
   16 IP225 PRINTER DR 33 HIRES GR ROUTINE
   17 HI-RES DUMP (IP2 34 SPLIT CATALOG.OR

  NUMBER <RET> = RUN  -NUMBER <RET> = LOAD
     TO SCROLL MENU  --> <RETURN>
     TO MENU DRIVE 1 --> ZERO <RET>
```

Figure 2. Last menu page.



```
          BEST CAT FOR DISK VOLUME 254
   .....................................

   66 WOZPAK HIRES RTN 83 DOS FINDER
   67 SPEED=N          84 SHAPE TABLE
   68 STRING SWAP      85 FP LISTER
   69 I.B. SCREEN DUMP 86 MAKE FP LIST
   70 LOWER CASE PTR R 87 INIT.S
   71 DISASSEMBLER     88 CATALOG
   72 RANDOM DRILL
   73 C -A MENU
   74 DEC FORMATTER
   75 NUMBERS >32767
   76 CRAWLER
   77 LIST
   78 SO WHAT
   79 POST-EDITOR
   80 PERSONIFY
   81 AUTONUM.L
   82 MODIFY PLE

  NUMBER <RET> = RUN  -NUMBER <RET> = LOAD
     TO MENU DRIVE 1 --> ZERO <RET>
     TO MENU DRIVE 2 -->  'D' <RET>
```

Both menus print the first 16 characters of each file name preceded by an identifying number. There are always five operation options available (although there is room to show only four of the five on each screen). First, typing in a file number and RETURN will RUN or BRUN the specified file.

Second, preceding a file number by a minus sign will cause a LOAD or BLOAD of the specified file. Third, pressing only RETURN will scroll the next menu page onto the screen.

If the last page of the menu is already on the screen when RETURN is pressed, the first menu page is scrolled onto the screen.

Fourth, pressing zero and RETURN will provide a menu from a disk in the same drive as the last menu. And fifth, pressing D and RETURN will provide a menu from a disk in the other drive on the same controller card. In other words, the D command causes a toggle between drive 1 and drive 2.

The Machine Language Subroutine

The explanation of how the subroutine works is detailed and may require that you read this section more than once. The numbers contained in this section are decimal except when preceded by a $ which indicates a hexadecimal number (base 16). The symbol < is read as "less than."

Best Little Cat creates a name look-up table in RAM to be used when a file is to be loaded or run. This table is also used to print the file names to the screen. This table is constructed by a machine language routine which is POKEd into memory by lines 10 and 20 of the Basic program. Listing 1 is a disassembled version of the routine and Figure 3 is a flowchart for it.

Listing 1. Disassembled input/output subroutine.

```
*300L

0300-   60          RTS
0301-   84 00       STY    $00
0303-   A0 00       LDY    #$00
0305-   C9 40       CMP    #$40
0307-   B0 02       BCS    $030B
0309-   69 40       ADC    #$40
030B-   91 02       STA    ($02),Y
030D-   E6 02       INC    $02
030F-   D0 02       BNE    $0313
0311-   E6 03       INC    $03
0313-   A4 00       LDY    $00
0315-   60          RTS
0316-   00          BRK
0317-   00          BRK
0318-   00          BRK
0319-   00          BRK
031A-   00          BRK
031B-   00          BRK
031C-   00          BRK
031D-   00          BRK
```

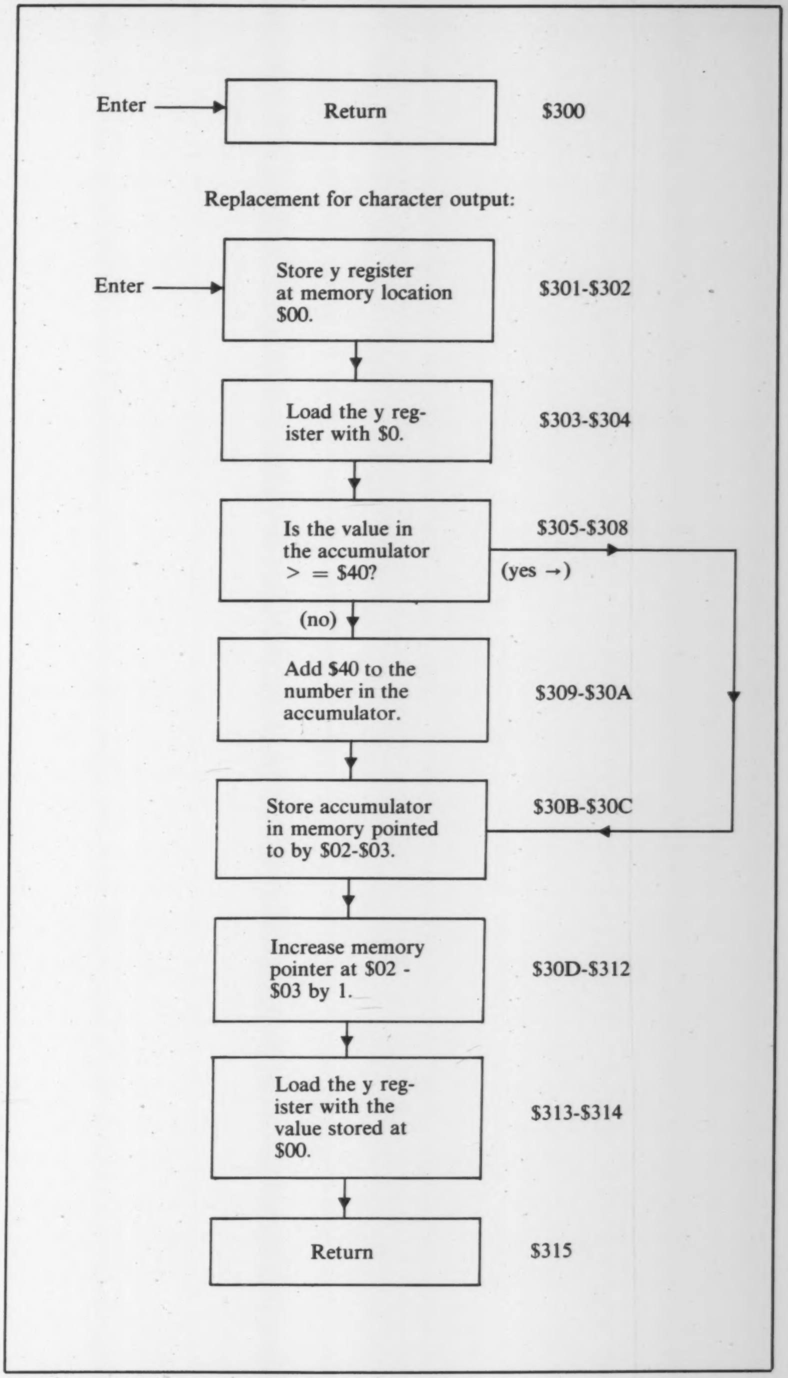

Enter
Return
$300
Replacement for character output:
Enter
Store y register at memory location $00.
$301-$302
Load the y register with $0.
$303-$304
Is the value in the accumulator > = $40?
$305-$308
(yes →)
(no)
Add $40 to the number in the accumulator.
$309-$30A
Store accumulator in memory pointed to by $02-$03.
$30B-$30C
Increase memory pointer at $02 - $03 by 1.
$30D-$312
Load the y register with the value stored at $00.
$313-$314
Return
$315

Figure 3. Replacement for keyboard input.

Actually, there are two routines which replace the normal input/output routines. The first one replaces the standard keyboard input routine which is in ROM. The other replaces the ROM routine which outputs text to the video screen.

The keyboard replacement routine is

at address $300. It is the shortest routine possible, and it simply returns control to DOS when DOS calls it. Without this one-step wonder, you would have to press RETURN to get DOS to start reading the disk file names.

The text (screen) output replacement routine starts at address $301 and ends at $315. Instead of printing text to the video screen, the replacement output routine builds a look-up table in RAM. For each character to be stored, DOS first reads a byte from the disk directory track (track $11) and places it in the 6502 accumulator. Then it calls to the replacement text output routine at $301. When this routine is called, the value stored in the Y register is saved to memory so it can be brought back later. (When using a machine language subroutine, you should exit the subroutine with the various 6502 register contents unaltered.)

Next, the Y register is set equal to zero. The byte in the accumulator is checked to see if it is at least $40. If it is less than $40, then $40 is added to it (this is important). After the code is tested, it is deposited in the memory location pointed to by $02 and $03 plus the offset contained in the Y register (which is always $00).

The pointer contained in $02 and $03 is then increased by one, the Y register is loaded back from memory (remember why?), and control is given back to DOS. DOS now reads another byte before calling $301 again. This cycle continues until the disk directory has been completely read and the table built. The normal keyboard/text output routine pointers are then reinstalled which causes the Apple to forget about the routines at $300 and $301.

Why Add $40—A Slight Diversion

If the character byte transferred from the disk directory to the accumulator is less than $80, it was not placed in the disk directory by Apple DOS. Probably, somebody used one of the available disk utility programs to place inverse or flashing screen codes in the disk directory. How can this be done? If you look on page 15 in the Apple Reference Manual, you will find the ASCII screen character set. By POKEing character values which are less than $80, fancy inverse or flashing headers can be part of a disk catalog. This technique works because the disk CATALOG function uses the standard ROM text output routine to print to the screen. Note, however, that Apple DOS will not LOAD or RUN flashing or inverse files so this technique can be used only for fancy catalog headers.

If you recall, the replacement output routine for Best Little Cat intercepts each character that DOS would send to the ROM screen print routine and sends it to a RAM location other than the text screen to be part of the look-up table. After the disk is completely cataloged, Best Little Cat uses a PRINT statement—i.e., PRINT CHR$ (PEEK(---))—to transfer the file names from the look-up table to the screen. So far, so good—or is it? When the CHR$ function is used to print an inverse screen character code, the character is converted to a control character (which is invisible on the text screen).

How does a screen inverse character become a control character? The CHR$ function was designed to work on standard keyboard ASCII, not Apple screen code ASCII. Normally, after the ROM keyboard input routine has read the keyboard for an ASCII value and the main program has received the character, the keyboard strobe is cleared so that the next character can be read. This clearing results in 128 ($80) being subtracted from the ASCII code of the character (refer to page 6 of the Apple Reference Manual).

These two different versions of ASCII are referred to as positive and negative ASCII. The CHR$ function has to work in an environment in which standard (positive) keyboard ASCII and/or "low band" (negative) keyboard ASCII could be encountered. Therefore it must recognize the negative ASCII codes and add 128 ($80) to them before translating from the numerical value to the actual character.

Try this: while in Applesoft Basic, type PRINT CHR$(193), CHR$(65) (RETURN). Two letter A's will be printed to the screen even though the codes are 128 character codes apart. If you look at table 7 on page 15 of the Apple Reference Manual, you will see that decimal 65 is actually the screen character code for a flashing A. However, since the code was processed through the CHR$ function, it was treated as a low band keyboard character, and 128 was added to it. This resulted in a normal character being printed to the screen. Now type PRINT CHR$(1) (RETURN). Nothing is printed on the screen. Decimal 1 is the screen character value for an inverse A. Again, this value was interpreted as a low band ASCII code and 128 was added to it. But when 128 was added to it, the result was a control character, and control characters are invisible on the video screen.

To avoid control characters, the replacement output routine must determine if the ASCII code is an inverse code (< $40 or 64) before POKEing it to memory. When the code for an inverse character is found, 64 ($40) is added to it, converting it to the code for a flashing character. Since the CHR$ function interprets flashing screen characters as normal screen characters, the character will be printed in a normal fashion. It must be emphasized that this code conversion is for display purposes only—inverse or flashing files cannot be loaded or run.

The Subroutine Summary

To sum it up, the replacement output routine converts inverse screen charac-

Little did Morty know that his only functioning brain cell was being invaded by an alien lifeform.

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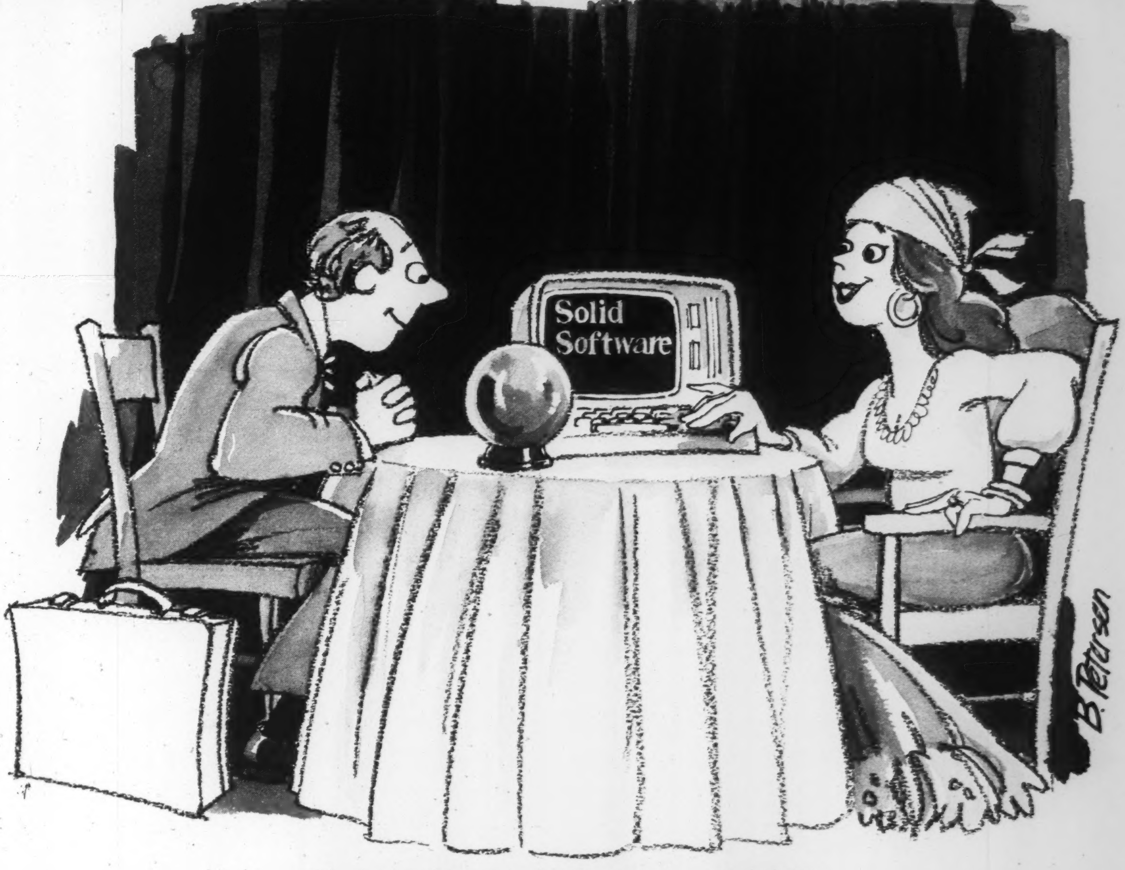

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ters ($00-$3F) to flashing screen characters ($40-$7F) before storing them in memory. This allows the Basic CHR$ function to be used as a screen character interpreter. The replacement routine stores control characters ($80-$9F) and alphanumeric characters ($A0-$DF) directly to memory without conversion. Therefore, Best Little Catalog correctly loads files with names that contain hidden control characters. Since DOS will not load file names which contain inverse or flashing screen characters, Best Little Catalog can only display these files.

The Basic Listing

Before explaining the Basic listing, I want to make one clarification. To avoid confusion between the number zero and the letter O, the letter O has not been used in variable names. The letter O appears only in Basic command words and within PRINT statement quotes. Therefore, the statement AB = 0 is equating the variable AB to zero, not to a variable named letter O.

Figure 4 shows the printing logic for Best Little Cat. These are the logical steps taken by the program when printing the non-final screens of a multi-screen catalog. The final screen logic is much the same except it "drops through" line 160 to lines 170 and 180. This printing logic is somewhat involved. If you understand how the printing is done, the rest is straightforward.

As mentioned earlier, lines 10 and 20 POKE the new I/O routine into memory at $300. Line 20 also dimensions memory for the variable A and sets an error trap. The rest of the listing is explained as follows:

Line 30 initializes variables, sets CP% to point to free memory space, POKEs the value of CP% into $02-$03, and sets C as a pointer to the DOS I/O pointers.

Line 40 POKEs the location of a new I/O routine in DOS, catalogs the disk, resets I/O pointers to normal ROM routines, sets C=1, and reads DISK VOLUME and volume number from memory.

Line 50 prints the menu header.

Line 60 begins the file reading loop and checks whether a file is a text file.

Line 70 saves a memory pointer for each file name and prints a space if the current file number is less than 10.

Line 80 prints the file number to the screen and increments the current file number.

Line 90 prints the file name and checks if the cursor is above the bottom of menu area.

Line 100 checks if the cursor is in the righthand column.

Line 110 sets the scrolling window for right column printing.

Line 120 sets the scrolling window for full width printing, prints instructions, requests input and prints the next menu screen if requested.

Line 130 checks if MENU OTHER DISK DRIVE was requested.

Line 140 converts a string variable to a real variable and checks if MENU SAME DISK DRIVE was requested.

Line 160 terminates the file reading loop and prints a space if fewer than 10 files are on the disk.

Line 170 prints a number equal to the number of files on the disk plus one, prints CATALOG, and sets the scrolling window to full width.

Line 180 prints instructions and requests input and checks if MENU OTHER DISK DRIVE was requested.

Line 190 checks if REPRINT MENU was requested.

Line 200 checks if CATALOG DISK was requested.

Line 210 checks if MENU ANOTHER DISK was requested.

Line 220 checks if LOAD command was requested.

Line 230 checks for invalid option number.

Line 240 assembles a string of the parameters chosen, and checks if it is a binary file.

Line 250 deletes the file parameters from the file name string and determines RUN or LOAD.

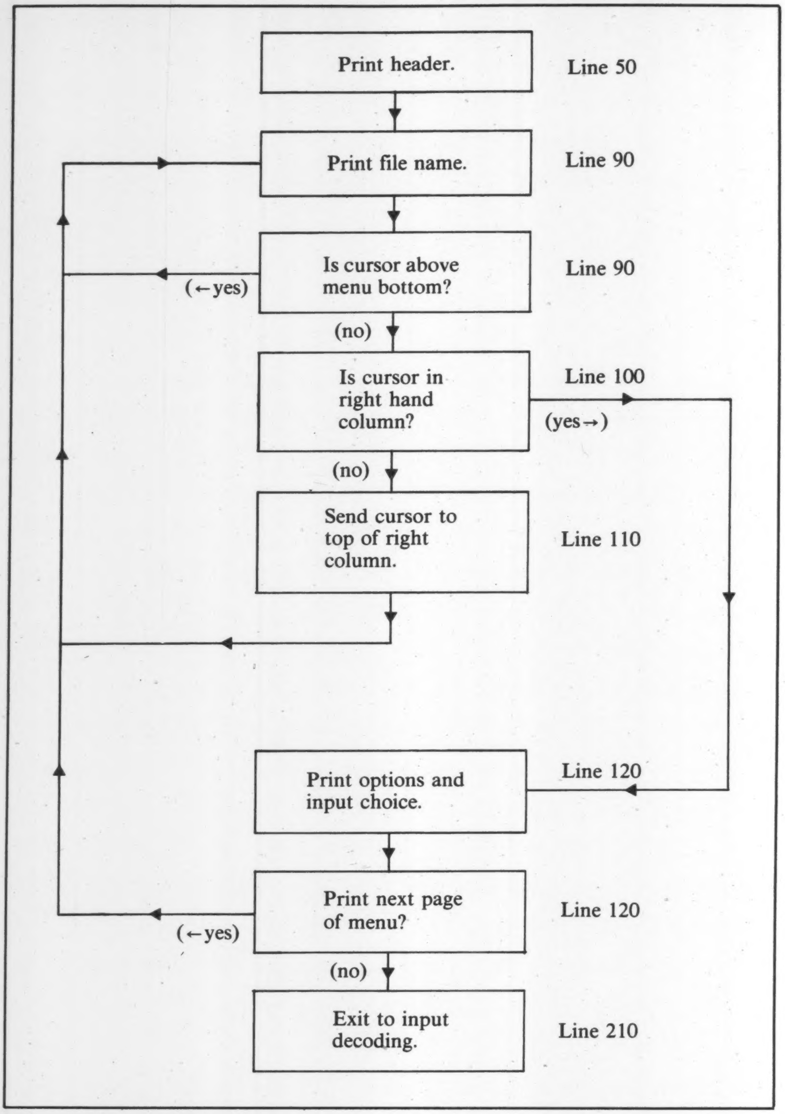

Figure 4. Menu printing logic.

Line 260 RUNs the chosen file.

Line 270 LOADs the chosen file.

Line 280 deletes the file parameters from the file name string and determines BRUN or BLOAD.

Line 290 BRUNs the chosen file.

Line 300 BLOADs the chosen file.

Line 310 CATALOGs the disk.

Line 320 checks for an invalid option number.

Line 330 sets the LOAD flag and sets the file number positive.

Line 340 POKEs in the stack clean-up routine found on page 82 of the Applesoft manual and calls this routine.

Line 350 resets the input/output pointers for keyboard input and text screen output and ends the program.

Program Entry And Debugging

When you first type in Best Little Cat, I suggest that you leave the statement ON ERR GOTO 340 out of line 20. Then, if you have made a typographical error, the Apple will tell you where the syntax error exists when the program is run.

When the program is completely entered, save it to a disk and remove the disk from the drive. Next, insert into drive 1 a disk containing at least 34 files, type RUN and press RETURN. The first 34 files on the disk will be displayed with a corresponding number. Press RETURN and the next page of files will be shown. A CATALOG option will follow the last file on the disk.

Type in the number that runs the CATALOG option and press RETURN. A normal catalog should occur. Type RUN and press RETURN. The first menu page will be displayed again.

If you have a second drive, remove the disk from drive 1 and put it in drive 2. Press D then press RETURN. Drive 2 will spin and the first menu page will be displayed. Regardless of which drive the disk is sitting in, choose a program, enter its number and press RETURN. That program will now run.

If Best Little Cat has behaved as just described, add the statement ON ERR GOTO 340 to line 20. Now a master copy of the program can be saved and used as a HELLO program when new disks are initialized.

Customization

Best Little Cat is a product of evolution. I suspect that two months from now it will have gone through at least one more generation. One handy change would be to include a CALL -151 on line 300 so that after a BLOAD, you will be in the monitor mode. Another would be for language card owners to have Best Little Cat load Integer Basic onto that card before displaying a disk menu. Several other ideas come to mind, but I don't want to stifle your creativity. ☐

Listing 2. Basic listing.

```
0  REM  BEST LITTLE CAT IN ALPHA, IL.
10  POKE 768,96: POKE 769,132: POKE 770,0: POKE 771,160: POKE 772,0: POKE
     773,201: POKE 774,64: POKE 775,176: POKE 776,2: POKE 777,105: POKE 77
     8,64
20  POKE 779,145: POKE 780,2: POKE 781,230: POKE 782,2: POKE 783,208: POKE
     784,2: POKE 785,230: POKE 786,3: POKE 787,164: POKE 788,0: POKE 789,9
     6: DIM A(105): ONERR  GOTO 340
30 H$ = "":PP = 1:D$ =  CHR$ (4):CP% = ( PEEK (115) +  PEEK (116) * 256) -
     6000: POKE 2,CP% - ( INT (CP% / 256)) * 256: POKE 3,CP% / 256:C =  PEEK
     (54) +  PEEK (55) * 256 + 2966
40  POKE C,1: POKE C + 1,3: POKE C + 2,0: POKE C + 3,3: PRINT D$;"CATALOG,
     D"D + 1: PRINT D$;"PR#0": PRINT D$;"IN#0":C = 1: FOR I = CP% + 2 TO C
     P% + 16:H$ = H$ +  CHR$ ( PEEK (I)): NEXT I
50  TEXT : HOME : HTAB (7): PRINT "BEST CAT FOR "H$: VTAB (2): FOR K = 1 TO
     39: PRINT ".";: NEXT : PRINT ".": VTAB (4): POKE 34,3
60  FOR I = CP% + 19 TO ( PEEK (2) +  PEEK (3) * 256) - 1 STEP 38: IF  PEEK
     (I + 1) = 212 THEN  PRINT " T ";: GOTO 90
70 A(C) = I: IF C < 10 THEN  PRINT " ";
80  PRINT C;" ";:C = C + 1
90  FOR J = I + 7 TO I + 22: PRINT  CHR$ ( PEEK (J));: NEXT J: PRINT : IF
      PEEK (37) < 20 THEN 160
100  IF  PEEK (32) = 20 THEN 120
110  POKE 33,20: POKE 32,20: VTAB (4): GOTO 160
120  TEXT : VTAB (22): POKE 34,3: PRINT "NUMBER <RET> = RUN  -NUMBER <RET>
      = LOAD   TO SCROLL MENU  --> <RETURN>              TO MENU DRIVE "D +
     1" --> ZERO <RET> ";: INPUT "";AB$: HOME : IF  LEN (AB$) = 0 THEN 160

130  IF AB$ = "D" THEN D =  NOT D
140 AB =  VAL (AB$): IF AB = 0 THEN C = 1
150  GOTO 210
160  NEXT I: IF C < 10 THEN  PRINT " ";
170  PRINT C;" ";: POKE 50,63: PRINT "CATALOG": POKE 50,255: POKE 32,0: POKE
     33,40
180  VTAB (22): PRINT "NUMBER <RET> = RUN  -NUMBER <RET> = LOAD   TO MENU
     DRIVE "D + 1" --> ZERO <RET>           TO MENU DRIVE " NOT D + 1" -->
      ´D´ <RET> ";: INPUT "";AB$: HOME : IF AB$ = "D" THEN D =  NOT D: GOTO
     30
190  IF  LEN (AB$) = 0 THEN C = 1: VTAB (4): GOTO 60
200 AB =  VAL (AB$): IF  ABS (AB) = C THEN 310
210  IF AB = 0 THEN 30
220  IF AB < 1 THEN 320
230  IF AB > C THEN C = 1: VTAB (4): GOTO 60
240  FOR I = A(AB) TO A(AB) + 36:A$ = A$ +  CHR$ ( PEEK (I)): NEXT I: IF  MID$
     (A$,2,1) =  CHR$ (194) THEN 280
250 A$ =  RIGHT$ (A$,30): IF PP < 1 THEN 270
260  TEXT : HOME : PRINT D$;"RUN ";A$
270  TEXT : HOME : PRINT D$;"LOAD ";A$: END
280 A$ =  RIGHT$ (A$,30): IF PP < 1 THEN 300
290  TEXT : HOME : PRINT D$;"BRUN ";A$
300  TEXT : HOME : PRINT D$;"BLOAD ";A$: END
310  TEXT : HOME : PRINT D$;"CATALOG": END
320  IF AB <  - (C - 1) THEN C = 1: VTAB (4): GOTO 60
330 PP =  - 1:AB = ( - 1) * AB: GOTO 240
340  POKE 790,104: POKE 791,168: POKE 792,104: POKE 793,166: POKE 794,223:
      POKE 795,154: POKE 796,72: POKE 797,152: POKE 798,72: POKE 799,96: CALL
     790
350  PRINT D$"PR#0": PRINT D$"IN#0": END
```

Variable List:

A()	Holds memory pointer for each file name.
A$	Holds file name to be loaded or run.
AB	Holds number of selected file.
AB$	Holds input response (number of empty string).
C	Holds DOS I/O pointer location. *or* holds file count as file names are read from disk directory.
CP%	Holds beginning address of file name table in memory.
D	Holds disk drive toggle value.
D$	Holds CONTROL-D.
H$	Holds DISK VOLUME and disk volume number.
I	Holds FOR/NEXT loop counter.
J	Holds FOR/NEXT loop counter.
K	Holds FOR/NEXT loop counter.
PP	Holds RUN vs. LOAD flag.

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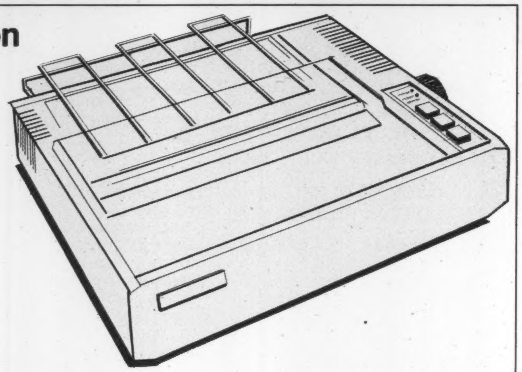
Q. What has the Gorilla Banana in common with printers sold by Commodore, Panasonic, SpectraVideo, and others?
A. They're all the same under the skin.



Print About Printers

David H. Ahl and David Grosjean

The Seikosha GP-100A printer is one of the most widely sold printers in the U.S., although it is rarely sold under the brand name Seikosha. Instead, Seikosha is an OEM (original equipment manufacturer) who packages their printer for distributors and computer manufacturers to sell under their own label.

Thus, Leading Edge sells this printer as the Banana, Axiom as the AT-100, Panasonic sells it as the JR-PO2U, Commodore as the 1525, and SpectraVideo as the SV-701. Several other manufacturers market it as well. We tested the Panasonic and Seikosha versions, although they are all virtually identical.

On The Outside

The printer measures a compact 16.6″ × 9.3″ × 5.4″ and weighs in at 10 pounds. The case is made of molded plastic in light beige and dark brown. A hard clear plastic cover over the printing mechanism reduces noise and protects the interior from dust.

Two LEDs on the front indicate "power on" and "error" conditions (paper jam or ribbon out). In the rear next to the power cord is an on/off rocker switch and a 0.5A fuse. On most versions there are no other switches or indicators—no linefeed, no form feed, and no on line/local switch (which allows the printer to be on but disabled).

To replace the linefeed and form feed, there is a mechanical paper dial which rotates the paper roller in a forward direction; it is not reversible.

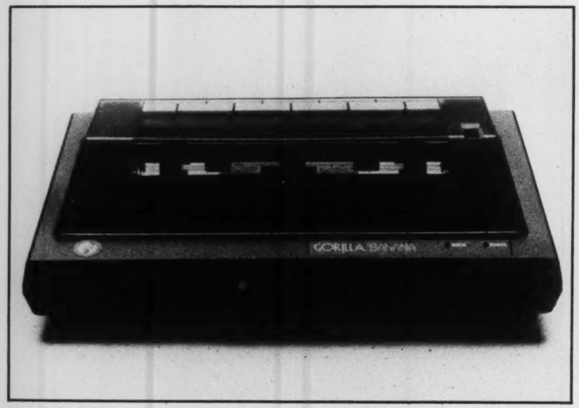
Loading And Connecting

The sprocket feed mechanism accepts pin feed paper, labels, and forms from 4.5″ to 10″ wide. Generally, most users will use 9½″ fan fold paper which can be stripped down to standard 8½″ × 11″ sheets. The printer does not have friction feed and does not accept single sheets.

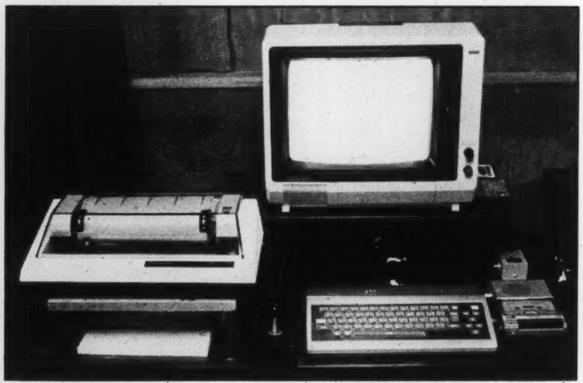
Loading the paper is quite simple and the manual with the JR-PO2U illustrates the steps in great detail. The printer accepts up to four-part forms and has an internal printing pressure adjustment which may be set in one of seven positions to produce the best density print.

The ribbon is continuous, but has two selk-inking cassettes which must be positioned over two spindles at the right and left side of the printer.

Although the manual indicates that a



Gorilla/Banana is one of many guises of the Seikosha GP-100A.

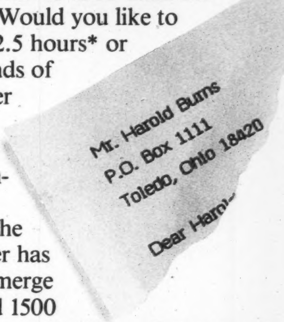


Panasonic JR-200 computer system with JR-PO2U printer at the left.

THE BUFFER DID IT.

Who Stole The 1500 Letters From The Computer?

Let's just say you've got to send a letter to 1500 different people. Would you like to spend 22.5 hours* or 60 seconds of computer time?

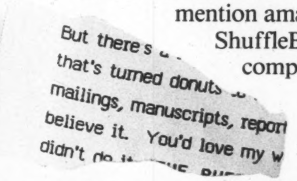


Mr. Harold Burns
P.O. Box 1111
Toledo, Ohio 18420

Dear Harol

With a garden-variety buffer, the computer has to mix, merge and send 1500 addresses and 1500 letters to the buffer. Trouble is, most buffers only store about 32 letters. So after 32 letters, the computer's down until the printer's done. Altogether, you're talking 22.5 hours.

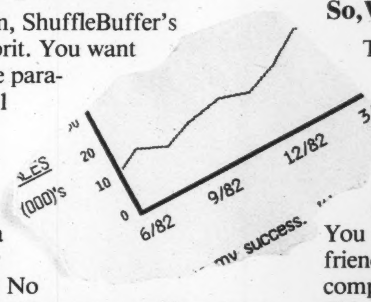
In the case of our new (not to mention amazing) ShuffleBuffer, computer time is 60 seconds flat. Just give ShuffleBuffer one form letter and your address list, and it takes care of the mixing, the merging, and the printing. But that's not all ShuffleBuffer's stolen from the computer. Oh, no.



But there's
that's turned donuts
mailings, manuscripts, report
believe it. You'd love my w
didn't do it

Who Changed and Rearranged The Facts?

Again, ShuffleBuffer's the culprit. You want to move paragraph #1 down where #3 is? Want to add a chart or picture? No problem. No mystery, either. Any buffer can give you FIFO, basic first-in, first-out printing. And some buffers offer By-Pass; the ability to interrupt long jobs for short ones. But only ShuffleBuffer has what we call Random Access Printing — the brains to move stored information around on its way to the printer. Something only a computer could do before. Comes in especially handy if you do lots of printing. Or lengthy manuscripts. Or voluminous green and white spread sheets. And by the way, ShuffleBuffer does store up to 128K of information and gives you a By-Pass mode, too.



And Who Spilled The Beans 239 Times?

Most buffers can't tell the printer to duplicate. If they can, they only offer a start/stop switch, which means you're the one who has to count to 239. Turn your back on your buffer, and your printer might shoot out a room full of copies. ShuffleBuffer, however, *does* control quantity. Tell it the amount, and it counts the copies. By itself.

So, What's The Catch?

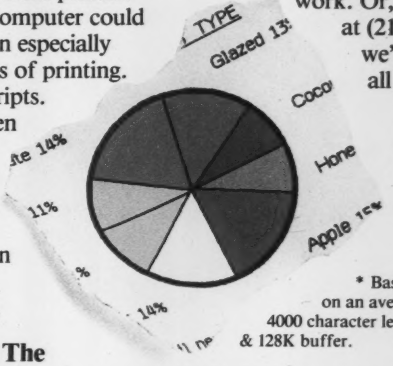
There isn't any. Sleuth around. You won't find another buffer that's as slick a character as this one. You also won't find one that's friendly with any parallel or serial computer/printer combination. This is the world's only universal buffer.

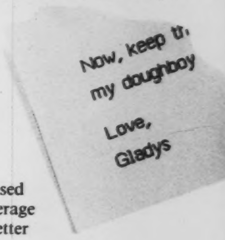
With a brain.

CIRCLE 179 ON READER SERVICE CARD

Who Wants You To Catch A ShuffleBuffer In Action?

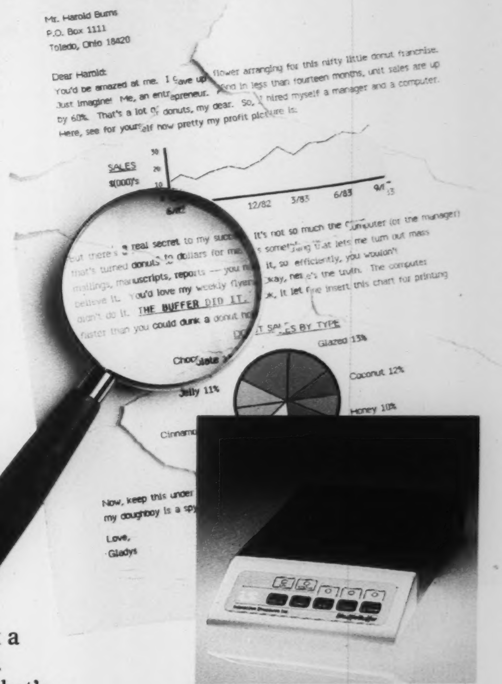
You guessed it. We do. Just go to your local computer dealer and ask him to show you a ShuffleBuffer at work. Or, you can call us at (215) 667-1713, and we'll clue you in on all the facts directly.





Now, keep th
my doughboy
Love,
Gladys

* Based on an average 4000 character letter & 128K buffer.



Mr. Harold Burns
P.O. Box 1111
Toledo, Ohio 18420

Dear Harold:
You'd be amazed at me. I gave up flower arranging for this nifty little donut franchise.
Just imagine! Me, an entrepreneur. And in less than fourteen months, unit sales are up
by 60%. That's a lot of donuts, my dear. So, I hired myself a manager and a computer.
Here, see for yourself how pretty my profit picture is:

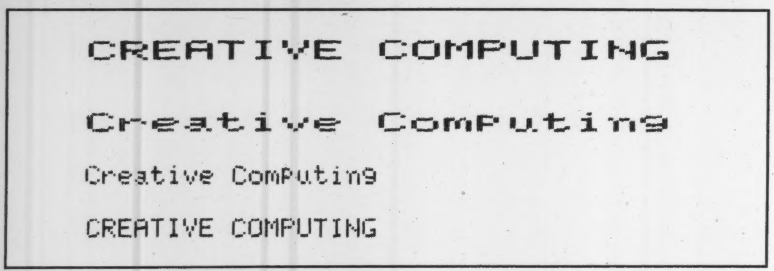
But there's a real secret to my success. It's not so much the computer (or the manager)
that's turned donuts to dollars for me. It's something that lets me turn out mass
mailings, manuscripts, reports — you name it, so efficiently, you wouldn't
believe it. You'd love my weekly flyers. Okay, here's the truth. The computer
didn't do it. THE BUFFER DID IT.
faster than you could dunk a donut
DONUT SALES BY TYPE

Now, keep this under
my doughboy is a spy
Love,
Gladys

ShuffleBuffer

The Buffer with a Brain

Interactive Structures Inc.
146 Montgomery Avenue
Bala Cynwyd, PA 19004



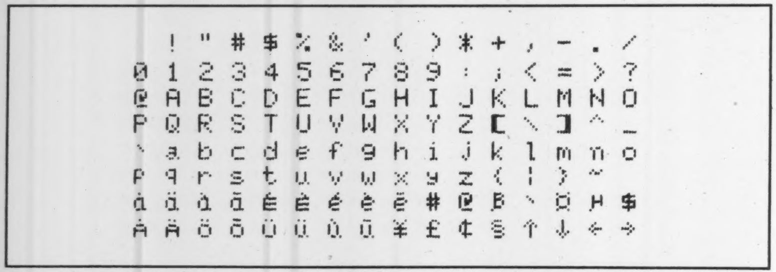
CREATIVE COMPUTING

Creative Computing

Creative Computing

CREATIVE COMPUTING

Figure 1. Single and double width characters.



```
  ! " # $ % & ' ( ) * + , - . /
0 1 2 3 4 5 6 7 8 9 : ; < = > ?
@ A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z [ \ ] ^ _
` a b c d e f g h i j k l m n o
p q r s t u v w x y z { | } ~
ȧ ä ȧ ā ė ė é ė ë # @ ß ` ö H $
Ȧ Ä ȯ ō Ü ü ů ū ¥ £ ¢ § ↑ ↓ ← →
```

Figure 2. Built-in character set has 124 letters, numerals, and symbols.

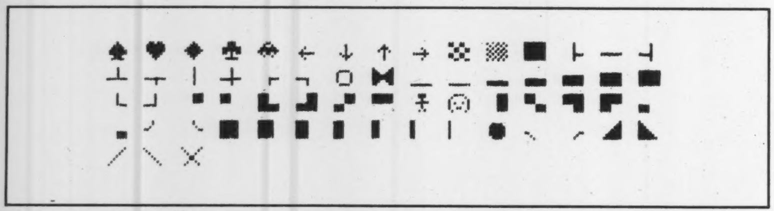


Figure 3. The printer can reproduce graphics characters as defined by the computer.

self-test mode is available, it is not at all clear how to activate it.

The printer has a standard Centronics-type connector which connects to any computer with this parallel protocol. An optional serial interface is available.

Printing

The specifications claim a speed of 50 cps, although speed in actual service was somewhat slower. It prints only from left to right and has a relatively small buffer of 480 bytes (about six lines).

The printer has three print modes, two for text and one for graphics. The default text mode prints 10 characters per inch, up to 80 characters per line, and six lines per vertical inch.

The statement LPRINT CHR$($OE) switches to the extended (double width) print mode of 5 characters per inch and 40 characters per line. (See Figure 1.)

Graphics mode is accessed with LPRINT CHR$($OF). This removes spacing between characters in both the vertical and horizontal directions to provide full, continuous graphics.

All printing is done with a 5 × 7 dot matrix printhead; thus there are no descenders on the lowercase g, j, p, q, and y. The printer has a character set of 124 characters which includes upper- and lowercase letters, numerals, 17 accented letters, the ASCII symbols, and a few extra symbols (see Figure 2). There are no built-in graphics characters, but the printer will reproduce graphics characters as defined by the computer (see Figures 3 and 4).

In addition to the usual LPRINT and LLIST commands, both the Panasonic JR-200 and SpectraVideo computers have commands which automatically reproduce the contents of the screen on the printer. Well, yes and no.

Depending upon the colors displayed on the screen, the printer may or may not print anything. For example, you may have a vivid screen display of red on blue or blue on red, but the printer does not distinguish these as different values for printing. Furthermore, the way graphics blocks are displayed on the screen is different from the way the print routine "sees" these blocks. For example, white on black and black on white may appear similar on the screen (reversed, of course), but the printer recognizes them as quite different (see Figures 5a and 5b).

Documentation

As with so many computers and peripherals the 15-page manual (with the Panasonic version) is a mixed bag. The section on setting up is comprehensive and well-illustrated. The section on operation has a few examples, and the section on troubleshooting is adequate. However, the manual does a poor job of explaining how to take advantage of the capabilities, particularly graphics, of the printer.

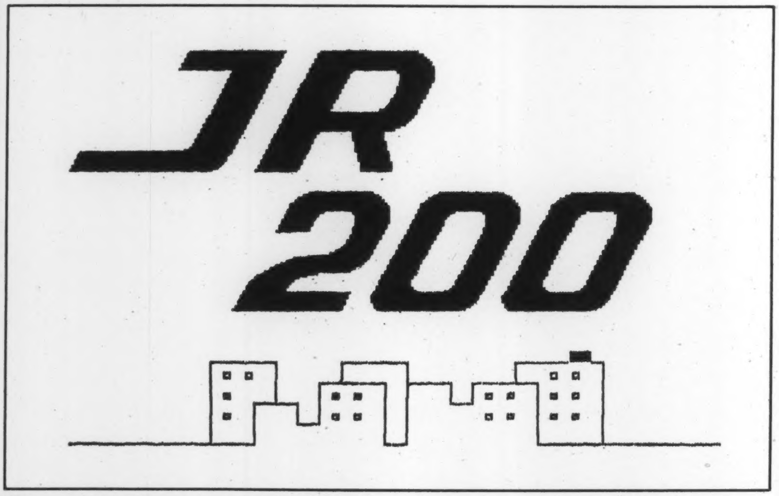


Figure 4. A screen composed of graphics characters can be reproduced on the printer with the HCOPY command.

FORM LENGTH
TOF SET
SEL
FORM FEED
LINE FEED
OKIDATA
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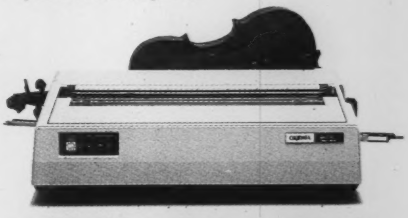

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CIRCLE 198 ON READER SERVICE CARD

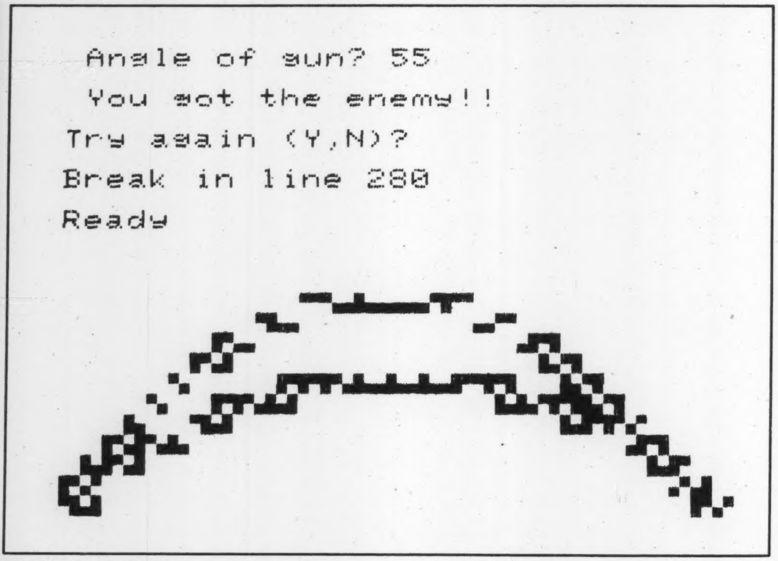
Print About Printers, continued...

The Bottom Line

Depending upon what it says on the front panel, you can pay between $249.95 and $369.95 for this printer. Of course, the versions from computer manufacturers usually come with connecting cables which sell for an astonishing amount when purchased separately.

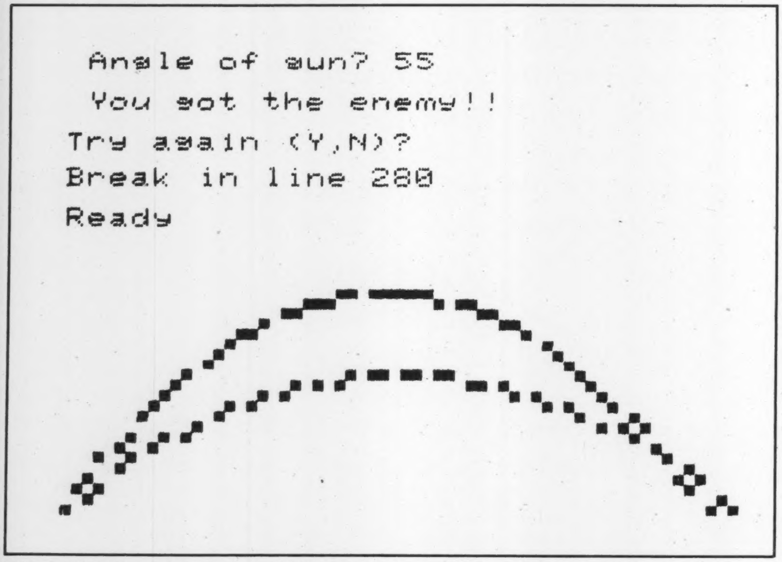
For the price, the Seikosha GP-100A is a capable performer for both text and graphics. Using the HCOPY command on the Panasonic and SpectraVideo computers with this printer, it is much easier to get screen prints than with much more expensive computer/printer combinations.

On the other hand, the printer doesn't have the speed, versatility, or print quality of an Epson or Diablo, but it costs a fraction as much. Also, we would have liked more complete documentation, but again, you get what you pay for. ☐



```
  Angle of sun? 55
  You got the enemy!!
Try again (Y,N)?
Break in line 280
Ready
```

Figure 5a. A black on white graphics screen does not reproduce correctly on the printer.



```
  Angle of sun? 55
  You got the enemy!!
Try again (Y,N)?
Break in line 280
Ready
```

Figure 5b. The same screen as in Figure 5a but with the color set to white on black reproduces correctly on the printer.

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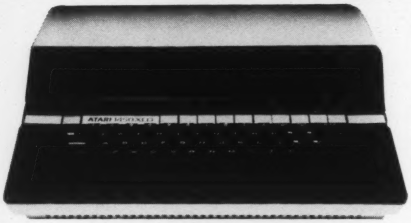

Outpost: Atari

Arthur Leyenberger

I am honored to be sitting in the same editorial seat that has been occupied by the likes of David and Sandy Small and John Anderson. Over the last two years this column has brought you (and me) an abundance of information. The charter was to be an oasis of Atari-related information, which at times, seemed to wander away from the easily obtained "tips and techniques" type of material into the more philosophical and esoteric. However, I believe these journeys have been worthwhile and in keeping with the concept and spirit of an outpost.

I plan to continue in the same tradition. My goal is to present at least one hardware and one software review each month, and to use this column as a clearinghouse for ideas, news and trends relating to the Atari computer. I hope that those of you who are old-timers will benefit from my experiences and continue to think of this column as yours. To the newcomers to the world of Atari computing, welcome aboard and be assured that I will not leave you behind.

Many people have asked me which computer to buy. The next few questions follow quite logically: how much memory do I need, what are the best programs, and the inevitable: should I wait until the prices come down some more.

When asked why they want to buy a computer, some respond with specific applications or a plan of action (like involving the whole family in computing, or automating their coin collection information). A majority of people either don't know what they would do with a computer or have general ideas of "learning about computers."

Arthur Leyenberger, c/o Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950.

The point is, if you want to get involved with computing, the time to buy a computer is *now*. If you wait six months, you may still not buy a computer. If you do, you will be six months behind in the learning process, when you could have been a veteran by now. Atari computers are excellent entry level machines that you will not outgrow as you progress from being a neophyte to an advanced user. The learning process continues. Atari computing remains challenging and fun.

Recently, I looked back at a 1976 issue of *Creative Computing*. On the back cover was an advertisement for the Altair 680 computer from MITS. For only $420 you could have a 1K (RAM) machine with RS-232 interface and provision for 1K ROM. There were no word processors available, no Basic language and definitely no Pac-Man. The darn thing was programmed in assembler from toggle switches on the front panel. I'll bet people were asking each other back then, "should I buy one now, or wait until the price drops a little?"

Computers are funny things. They have a strange habit of being used for all kinds of applications once they find a home. Typically, the owner has no idea about real uses prior to getting a computer. I strongly believe that it is fine to want to "get into computing." Continue to read *Creative*. Read some books and talk to people. Then go out and buy a computer and start to use it.

Attention Teachers

More and more, computers are becoming a regular part of the educational scene. Computers are showing up in the classroom faster than New Jersey mosquitos at a *Creative Computing* staff picnic. One of the problems that teachers face is the continuing struggle to choose good educational software from the vast assortment of generally mediocre courseware. Rather than have educators re-invent the wheel by evaluating the same Atari software in every school in the land, a new group called the Atari Teachers' Network is forming. It will provide a medium of communication between Atari users and the educational community. The network is headed by Nancy Austin Schuller and Curt Springstead.

The low entry price and superior sound and graphics of the Atari make it promising for use in educational settings. It is in this spirit that the group has formed and committed to sharing Atari-related information—and acting as an educational resource. The group publishes a quarterly newsletter containing reports, questions and answers, an exchange of software written by teachers, and discussions about computers in the classroom, and Atari in particular.

The newsletter also contains information from insiders at Atari on the company's current projects. For more information on the network and the newsletter, contact the Atari Teachers' Network, P.O. Box 1176, Orange, NJ 07051. A one year membership is $4.

Add Music to Your Basic Programs

How many times have you wished that you could add a little music to your Basic programs? Maybe a little Bach while the title screen to your latest adventure game is being displayed. Or perhaps the theme from Star Trek melodically enveloping

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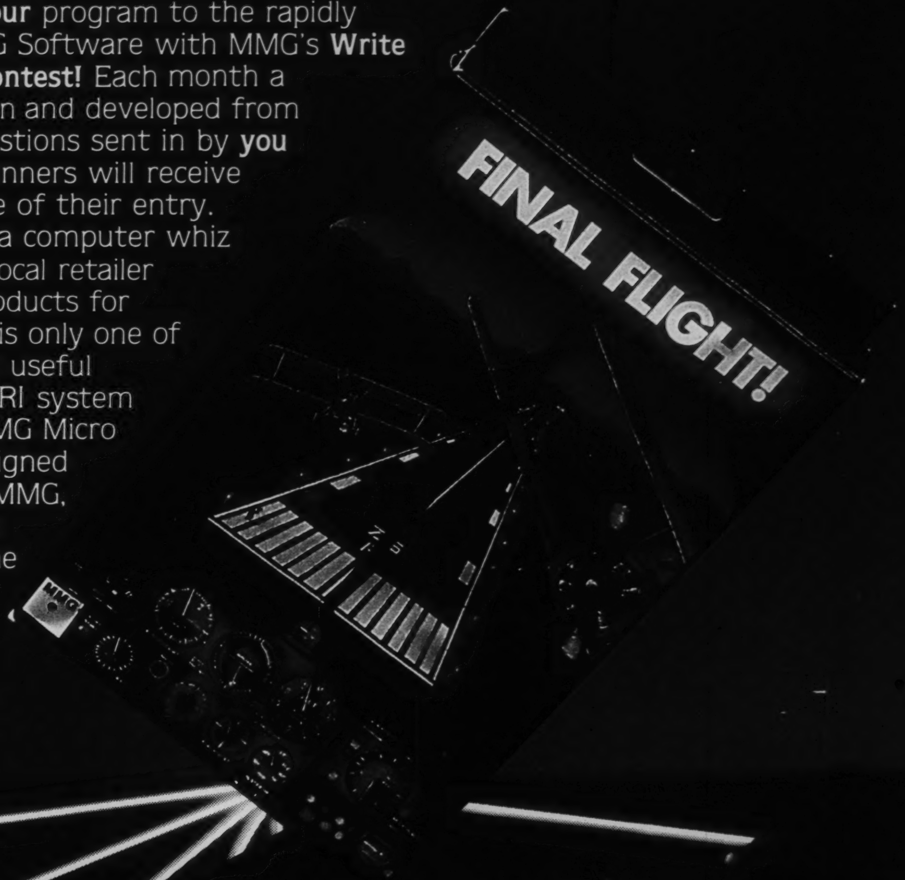

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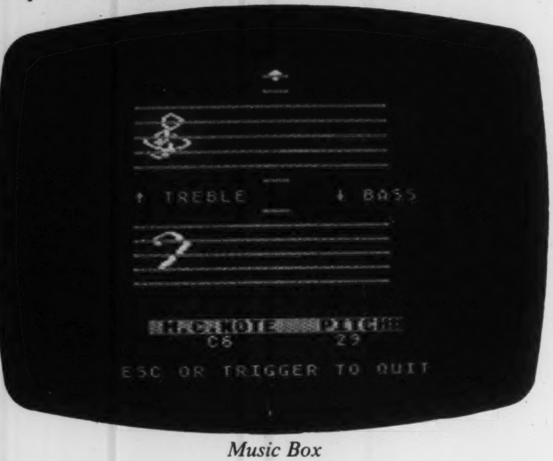

C6 29

ESC OR TRIGGER TO QUIT

Music Box

Matchboxes

you as the Enterprise warps out of orbit. Well, now there is a utility, programmed by Jerry White, that allows you to do all of this and much more. *The Music Box* from Program Design Inc. (PDI) allows you to play Atari Music Composer files (after conversion) during the vertical blank interrupt routine from Basic.

The music runs independently of Basic. You can display graphics on the screen or do calculations while the tune continues. You can even stop the program, list it and do some editing with the music going. However, once any I/O operation is performed, the music is interrupted.

There are actually five separate Basic programs and a menu driver that make up *The Music Box* utility. The CONVERT program converts *Atari Music Composer* (AMC) data files into *Music Box* (MB) files that can be used with the COLORGAN and PLAYTEST programs. This program runs slowly but is not objectionable. After an *AMC* file has been converted to MB format, the PLAYTEST program is used to play it using a machine language routine.

Normally the program prompts for the program to be played, loads it from disk and begins playing it immediately. However, by deleting a section of code (lines 350 to 500) your own Basic program can be entered between lines 350 and 7998. Even after the removal of these lines, there is still some prompting for a file name from the program. Table 1 contains a list of the overhead code that should be removed for incorporating the PLAYTEST program with your own program.

Another program, COLORGAN, contains a machine language routine that interprets the frequency and volume of MB data files and displays a psychedelic, graphics mode 19 image on the screen. These colorful, pulsating images will bring back memories for all who survived the late sixties.

The MUSICBOX program is designed to help you understand how to enter sheet music into *Music Composer*. It uses player/missile graphics to display notes, sharps, flats, and the treble and bass clefs. The joystick is used to manipulate the notes on the screen, and as the display changes, the appropriate sound is heard. The pitch number and *Music Composer* interpretation of each note is displayed at the bottom of the screen.

The final program, TRANSLAT, is used to dump *AMC* data files to either the screen or a printer. This is handy for debugging your song files and making a permanent record of them.

As an example of combining sound and graphics, I used the flag program from the Atari Basic Reference Manual (Appendix H-9) and inserted it within my stripped down MUSICBOX program. I then included a converted *Music Composer* file of the Stars and Stripes Forever on the same disk. When the program is run, the Stars and Stripes plays as the American Flag is drawn on the screen. Let it never be said that the Atari computer is not patriotic.

Table 1. Modifications to PLAYTEST program.

```
Delete the following lines:
   350 — 500
   8010 — 8080
Add:
   8120 POKE 53279,0: POKE 53279,0: USER$=ANYNAME.MBD":
   LU=LEN(USER$): IF LU=0 THEN 12000
Where filespec "ANYNAME.MBD" is a converted Music Composer File
```

The *Music Box* is a very useful music utility if you wish to play Atari *Music Composer* files from a Basic program. The manual is well written and the disk contains eleven converted *Music Composer* files. It requires 32K RAM and costs $29.95.

Good, Clean Fun

Detractors of video games say that among other things, these electronic menaces are responsible for the break up of the American family. I would have to agree to some extent with this comment. Consider the facts. Most video games are of the shoot-'em-up variety and are generally played by one person. I mean, how much fun can people over 30 really have with twitch games, anyway?

When I was growing up, I used to enjoy family time when we would all play such games as Monopoly, Scrabble, and Tripoli. In fact, I still enjoy an occasional game of Scrabble as long as professional Scrabble players like my wife's mother, Phyllis, are not around. In any case, there are very few games for the Atari computer that the whole family can enjoy. *Matchboxes* from Broderbund is different. Programmed by Al Cheser, it is not only fun for the whole family but is also wholesome and well done.

Matchboxes is really several variations of the old standby game Concentration. In this game, a 6 x 6 matrix is displayed on the screen and the object is to pick two squares that match. Hiding behind each square is an animated monster, shape, or object that has its own unique tune. The tunes are all familiar—Clementine, Pop Goes the Weasel, I've Been Working on the Railroad—and are usually associated with the particular graphic.

In the simplest game, you play against

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an opponent or the computer and the player with the most matches at the end of the game is the winner. There are some tricky matches where the object may be the same but in two different colors. Occasionally, wild cards turn up which will match anything.

There are three other variations of the game that can be played either alone or with someone else. One game permits each opponent to select a word which is hidden behind the puzzle. As pictures are matched, parts of the word are exposed, and the first one to guess the word is the winner. Another version of the game has the hidden words spelled backwards. I played this version several times and kept losing until I realized that the words were backwards (next time I will read the instructions first). The final variation has the hidden words scrambled. I am terrible at this particular variation.

Matchboxes is available on disk or cassette, requires 32K, and costs $29.95. This really is a *fun* game and one that the whole family can enjoy together. There ought to be more such games.

Atari User Groups

Some of you might know me as the editor of the Jersey Atari Computer Group (JACG) Newsletter. I have spoken to others of you and have accessed your bulletin boards. Having been associated with the JACG and its 500 members for over a year, I now realize many things about the world of Atari and specifically the Atari computer user. I can easily say, without fear of being struck by lightning, that Atari users are generally the most energetic, interested, loyal, and diverse group of people I have ever met. If you don't belong to a user group, call Atari's toll-free number to find the one nearest you. Then join and participate in computing.

In the past, Atari has been unwilling to realize (or take advantage of) the fact that their users are their best salespeople. The future may bring some changes, but we'll have to wait and see. My crystal ball is a little cloudy right now. There are over 50,000 members of Atari user groups in the United States alone, and that number is increasing steadily.

I mention this as a prelude to a request that all Atari user groups send me their newsletters. I want to stay in touch with what is *really* happening in Ataridom and I feel that this is the best way to do it. I also welcome suggestions and comments from users on what type of material you would like to see covered in this column. I cannot answer every letter, but I assure you I will read every one. If you would like a reply, please enclose a self-addressed stamped envelope. Send input to me, in care of *Creative Computing*, 39 East Hanover Ave., Morris Plains, NJ 07950.

Listing 1.

```
32000 REM SCREEN LOAD UTILITY BY TOM PAZEL.
32010 REM LOADS SCREEN FROM DISK FILE.
32020 REM SHOULD WORK FOR ANY BASIC
32030 REM GRAPHICS MODE.
32040 REM USES PAGE 6 (WHAT ELSE?)
32050 REM FOR MACHINE LANGUAGE ROUTINE.
32060 GOSUB 32100:REM POKE IN MACHINE CODE
32070 OPEN #1,4,0,FILE$
32080 A=USR(1536)
32090 GOTO 32090
32100 FOR ML=1536 TO 1639:READ BYTE:POKE ML,BYTE:NEXT ML:RETURN
32110 DATA 104,162,16,165,87,24,101,87,168,185,80,6
32120 DATA 157,72,3,200,185,80,6,157
32130 DATA 73,3,169,7,157,66,3,165
32140 DATA 88,157,68,3,165,89,157,69
32150 DATA 3,32,86,228,162,16,169,9
32160 DATA 157,72,3,169,0,157,73,3
32170 DATA 169,7,157,66,3,169,2,157
32180 DATA 69,3,169,192,157,68,3,32
32190 DATA 86,228,162,16,169,12,157,66
32200 DATA 3,76,86,228,192,3,224,1
32210 DATA 240,0,240,0,224,1,192,3
32220 DATA 128,7,0,15,0,30,0,30,0,30,0,30
```

Listing 2.

```
32000 REM SCREEN SAVE UTILITY BY TOM PAZEL.
32010 REM SAVES SCREEN TO DISK AS A FILE.
32020 REM SHOULD WORK FOR ANY BASIC
32030 REM GRAPHICS MODE.
32040 REM USES PAGE 6 (WHAT ELSE?)
32050 REM FOR MACHINE LANGUAGE ROUTINE.
32060 GOSUB 32100:REM POKE IN MACHINE CODE
32070 OPEN #1,8,0,FILE$
32080 A=USR(1536)
32090 END
32100 FOR ML=1536 TO 1639:READ BYTE:POKE ML,BYTE:NEXT ML:RETURN
32110 DATA 104,162,16,165,87,24,101,87,168,185,80,6
32120 DATA 157,72,3,200,185,80,6,157
32130 DATA 73,3,169,11,157,66,3,165
32140 DATA 88,157,68,3,165,89,157,69
32150 DATA 3,32,86,228,162,16,169,9
32160 DATA 157,72,3,169,0,157,73,3
32170 DATA 169,11,157,66,3,169,2,157
32180 DATA 69,3,169,192,157,68,3,32
32190 DATA 86,228,162,16,169,12,157,66
32200 DATA 3,76,86,228,192,3,224,1
32210 DATA 240,0,240,0,224,1,192,3
32220 DATA 128,7,0,15,0,30,0,30,0,30,0,30
```

General Purpose Screen Save/Load Utility

Often, when creating graphic screens in Basic it is useful to save the screen for future use. Similarly, when writing a program that requires multiple screens throughout its operation, it would be handy to be able to load graphic screens from disk. Well, Tom Pazel of Dover, NJ has written a couple of very useful utilities to do just that. What's more, graphics mode 8 (and higher) screens are fully compatible with Datasoft's *Graphic Master* program. Let's take a closer look at Tom's programs.

Listing 1 is the Load routine. It is really quite simple to use. The following two

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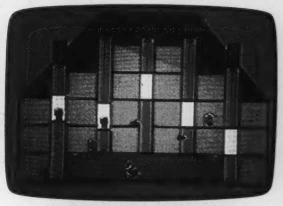

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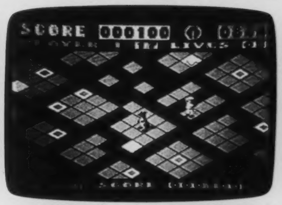

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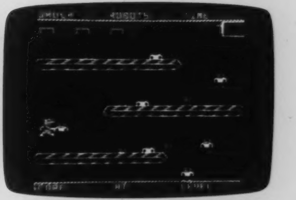

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Outpost: Atari, continued...

Listing 3.

```
5 REM SAMPLE GRAPHICS PROGRAM
7 REM BY TOM PAZEL.
10 DIM FILE$(14):FILE$="D:TESTPGM.SCR"
20 GRAPHICS 10
30 POKE 704,0:POKE 705,14:POKE 706,26:POKE 707,42:POKE 708,58
40 POKE 709,74:POKE 710,90:POKE 711,106:POKE 712,244
50 FOR I=0 TO 79
60 COLOR I+1:PLOT I,I+2:DRAWTO I/5*2,I*2
70 NEXT I
80 GOTO 80
```

lines of code must be typed in:

```
10 DIM FILE$(20):FILE$=
   "D:Anyname.ext"
20 Graphics n
```

"Anyname.ext" is the name of the disk file that contains the screen image. On line 20, n refers to the graphics mode of the screen image. Next, the Load routine, which has previously been listed to the disk, is merged with the above two lines using the ENTER command. Type RUN, and the screen file is loaded and displayed.

The Save routine (Listing 2) works in a similar way. Your Basic program should not have any line numbers higher than 31999. Also, a line similar to line 10 above should be included somewhere near the top of the program. Then ENTER the Save routine (which has been written previously to the disk in LIST format). "Anyname.ext" is the filespec of what you want to call the save screen.

Now, merely run your program. Your program will draw its pretty picture and, after a slight pause, the disk drive will become active, the screen being saved as a disk file under the name you specified. Be sure that when run, your program currently in RAM will execute the Save routine as the last thing it does. In other words, don't use line numbers higher than 31999 and avoid lines such as:

```
300 GOTO 300
```

Listing 3 is a sample graphics program that can be used to test the Load and Save routines. Notice that line 80 is a no-no when using the Save utility. It must be deleted before running the program.

These utilities work with all 12 Basic graphics modes. What can you do with these utilities? Well I can think of a few uses. Graphics modes 1 and 2 title screens can be saved for future use and loaded as needed. As mentioned before, screens using graphics modes 8 and above can be created, saved, and then brought into a program like *Graphics Master* to put on the finishing touches. Then, after the screen is once more saved to disk, it is ready for use any Basic program. Thanks Tom, for a fine job on these useful routines.

I hear the music playing in the background, meaning it is time to fold up our tents for this edition of the Outpost. Christmas is not too far away, so next month I will have my Christmas list of Atari products. Both existing products and dream products from my wish list will be mentioned. ☐

Firms Mentioned In This Column:

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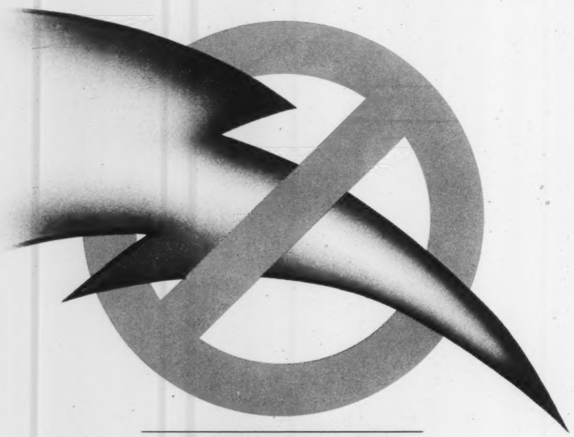

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IBM Images

Susan Glinert-Cole

Although I write this with a glass of iced coffee resting dewily beside the computer, by the time these words see the inside of a magazine, the iced coffee will have been transformed into a defrosting turkey. I realize that poultry is not a featured peripheral of most computers; in my case, however, it serves to remind me that it needs to be cooked. Without its constant presence, Thanksgiving might well become a feast of Dr. Pepper and Fritos.

We are fast approaching the Christmas season, and withal the problem of what to buy everyone in the household such that it can be played with—preferably on an IBM. This philosophy is designed to please everyone concerned, especially me. I recall one unmemorable Christmas morning, when I was presented with three flannel nightgowns, an umbrella, a wind-up crab (slightly broken from having been diddled with by the giver) and a pair of practical, furry slippers. Everyone else was having a grand time playing with *their* little gizmos.

I ask you, how do you play with an umbrella? Therefore, this month we will look at some software guaranteed to keep this from happening to you. Give your computer a Christmas present.

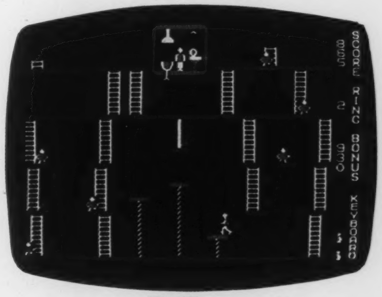
Big Top And Master Miners

Funtastic, the software house which has been responsible for turning my hand into a joystick claw, has two new games on the market: *Big Top* and *Master Miners.* Both uphold the addictive tradition of *Cosmic Crusaders* and *Snack Attack* and are among the best arcade games available for the PC. They are both copy-protected and require 64K and the color graphics adapter.

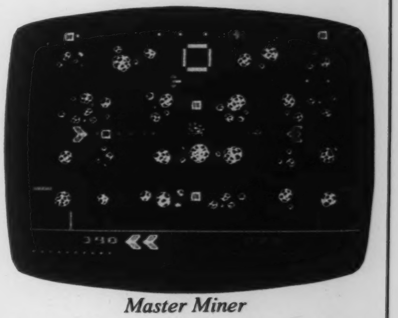
Master Miners bears a resemblance to *Crossfire,* if you are familiar with that game. The game transforms the lowliest computer user into an asteroid miner first class. The object of the game is to maneuver around the asteroid belt and mine the gems which appear around the display.

Points for a successful catch are given only after you have returned to home base and dropped off the payload. The situation is complicated by various nefarious occupants of the asteroid belt, such as the exceedingly greedy Commie Claim Jumpers, which beetle around the maze, swipe jewelry, and spirit it off to the Commie starbase (Vladivostok?).

Your ship comes equipped with a supply of torpedos, with which you can vanquish all the little beasties around you. *Master Miners* has a two-player mode, which can be used from the keyboard, or, if yours is the Complete Computer, dual joysticks can be employed. The biggest problem with this mode is, that instead of rounding up diamonds and assaulting the aliens, the players around here end up shooting each other instead. This game may initiate many nasty arguments concerning strategy and fair play.



Big Top



Master Miner

Big Top is unique, very funny, and, like all the other Funtastic games, full of excellent graphics. Wendell the acrobat must be guided around a circus ring with the keyboard or joystick to collect all the pink hats in the vicinity. He must go up and down ladders, swing from ropes, and slide down poles while avoiding local problems, like clowns, knives, and beach balls.

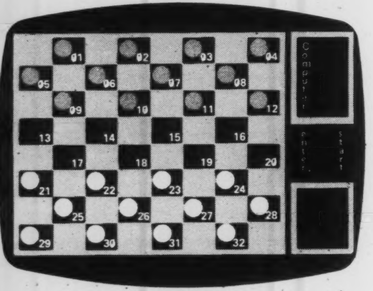
Wendell can jump, duck, and fall a short distance, but considerable dexterity and timing are needed to do these maneuvers effectively. When all the hats are collected, a ladder appears. Climbing the ladder puts Wendell in the next ring. I have seen only three levels of rings; the documentation claims there are more.

Points are awarded for accumulating hats, prizes, and weights; the faster a round is completed, the more bonus points are awarded. This game is harder than it looks.

IBM Strategy Games

If thinking is one of your habits, this set of games will let you indulge to only a mild degree. The package consists of four games on one disk, Checkers, Elusion, Battleship, and Reversi. The disk is not copy-protected and requires 64K and a color graphics adapter card. All the games are colorful and cheery, and because they are not difficult to beat, they are ideal for children. None of these implementations are particularly challenging to anyone with a little experience with strategy games.

The checkers game is called Checkers for Beginners. It does have two levels of play, beginning-beginner and beginner. After you have made a move, a prompt announces that the computer is thinking. The prompt changes color during this activity and is accompanied by little beeping noises to give you a feel for how hard the PC is working its silicon synapses.



Checkers for Beginners

When it has discovered a move, a light bulb appears (with appropriate auditory accompaniment). Generally this fanfare is followed by a move, but sometimes the computer discovers that the move it found wasn't so hot, so it returns to its colorful and noisy thinking mode.

I haven't played checkers in years, but this game was easy to beat. It was rather pathetic, waiting for it to finish making like a rainbow and a friendly, low-key French horn, knowing it was doomed to a triple jump.

Elusion is a game created just for the PC. It is played on a square board and the object is to make the last move. It takes about three games to dope out a consistent winning strategy, but the game board is cute.

Battleship comes up with a really clever graphic display, complete with an anchor chain and an air raid siren noise that is uncomfortably realistic. The game itself is standard Battleship, played on a grid. You must guess where your opponent's ships are located and then shoot to kill.

The game can be played in three different modes: you try to sink the computer's navy, you and the computer try to sink each other's ships, or you and a friend can battle it out. The graphics on this one are very well done. Those of you with a lugubrious turn of mind will enjoy this rendition of an old favorite.

Reversi, a.k.a. Othello, can be a very challenging game to play when a good algorithm has been used in planning the computer strategy. The game is played on an eight by eight board. The object of the game is to take as many squares as possible by capturing the opponent's markers.

This is done by playing a piece in such a way that you enclose markers of the other player. You must capture a piece on each move.

This version of Reversi is very slow and can always be won. I have two other versions of the game, both of which are fast and mean. If Reversi, or Othello, is a game you enjoy, I recommend the version in the *Friendly Ware Introductory Set* from FriendlySoft.

101 Monochrome Mazes

This game (also from IBM) will run only on the monochrome display, alas. I don't have one at home, and am therefore constrained to playing it at the office. The designers should have realized the implications of the sound effects . . . it is embarrassingly apparent to everyone in the office when you are not doing charts, graphs, or word processing.

Some of the noise can be toggled off with one of the game options, but there is always a little background of obvious beepings when you are not doing too well. These beepings will draw your boss into the office to find out what you are doing. Your boss will probably not find this game as entertaining as you will.

The graphics for *Monochrome Mazes* are done as well as could be expected, given the limitations of a monochrome display. Safe areas are in dark green, walls are light green, and the pools of water are black. You select the maze number, speed of the marker, full sound option, and scoring method (timed or point value).

Each level of difficulty has 10 mazes; maze 101 is on a level of its own. Scoring is a combination of maze level, marker speed, and time of completion. If you fall into a pool, survival points are awarded, depending on how far the marker went before drowning.

The low numbered mazes are pretty easy, but don't be fooled into thinking that they are all this way. As you progress up the levels, new hazards appear: invisible walls, trap doors, and pools of water where the marker has just been (which makes returning from a blind alley impossible). The game has no joystick option and is played with the numeric keypad only. A few of these games are a good refresher in the middle of a long day at the office.

Is There Life After Zork?

Infocom continues to produce classy, complex text adventure games, one of which is almost guaranteed to drive the most seasoned adventurer nuts. *Starcross,* a science fiction adventure, is reviewed in the 1983 *Creative Computing Software Buyer's Guide.*

Suspended, another game with a sci-fi theme, is reviewed in the September, 1983 *Creative Computing.* See these issues for detailed descriptions of these excellent games.

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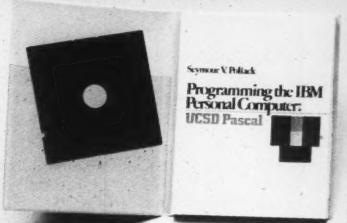
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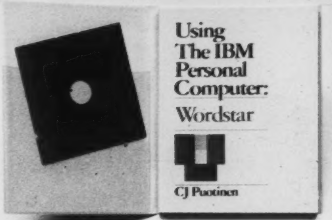
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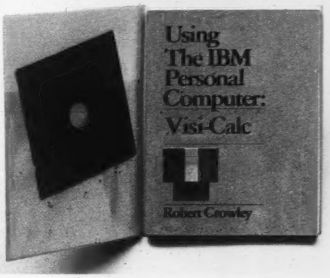
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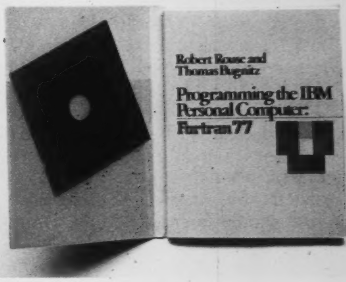
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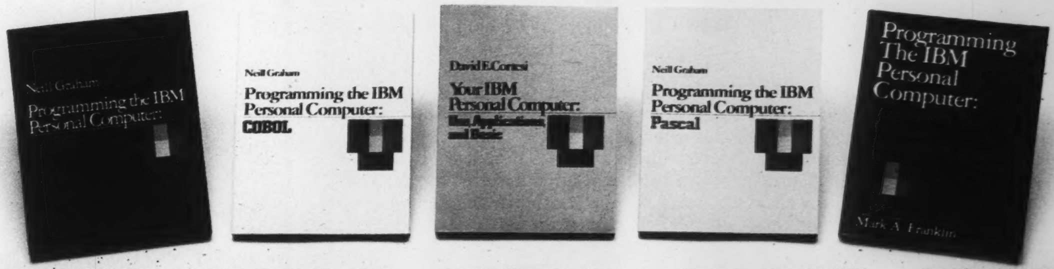
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about that) than *Starcross* and *Suspended*. The packaging is marvelous, being the documentary evidence folder (complete with lab reports, interview excerpts, and a package of Ebullion—the presumed cause of death) for the late lamented Marshall Robner. You are the detective responsible for investigating this possible homicide case by interviewing the family, snooping in closets, and ultimately making the (correct) arrest.

The neat thing about this game is that it happens in real time; you have 12 hours to solve the mystery and all the events which take place are happening around you in a realistic fashion. People are moving about out of your purview, just as they do in real life. This is in contrast to other adventure games where nothing happens unless you cause it to. Infocom says this is a first in a series of detective adventures. This one will keep you busy for a long time.

All these Infocom games allow one back-up copy to be made and require at least 48K memory. If you have a 512K adapter board in your computer, you may have to return the software to Infocom for a patch, as some copies do not load if more than 64K is signaled from the motherboard. If your games refuse to load and the family is screaming around you, set the switches on the system board to 64K. This is a pain, but better than having your spouse gnawing on your ankle.

High Tech Fingerpaint

Many of the drawing packages designed for the computer leave much to be desired in terms of speed and flexibility. *Creative Graphics,* by Accupipe, is a well designed and reasonably fast program which is very easy to use. It is also easy to crash if you are not careful to follow the directions.

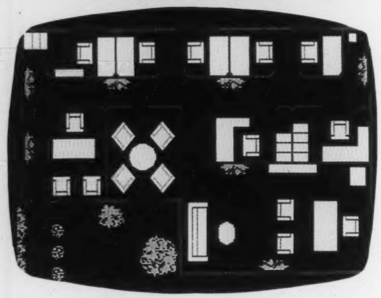
The packaging is elegant; it consists of an understated dark blue binder about a half an inch larger than the IBM notebooks, a printed template for the function keys and an excellent presentation of the capabilities of the program. Half of the manual is a 29-minute tutorial to get you started, and the remainder gives more detailed coverage of the individual commands.

No matter
how you look
at it...
it's
CR AT VE !!

Creative Graphics

The program will dump your picture to an IBM or Epson with Graftrax or an IDS Prism or Microprism printer. The review copy required 64K of memory, DOS 1.1 and, of course, a color graphics adapter card. It is also copy-protected.

CREATIVE
GRAPHICS
software
for the
IBM PC



Creative Graphics

The program is well designed from a human interface point of view. All commands are chosen with the function keys and sub-menus which appear to give clear directions for further choices. When the program is invoked, a screen appears with a cursor in the center, a drawing mode toggle, and a current drawing color indicator.

By pressing the function keys, the drawing color and palette may be changed. Different drawing modes may also be selected; freehand line drawing (up, down, right, and left only), and an automatic function which will produce boxes, circles, ellipses, or diagonal lines with a few well-placed keystrokes. During the drawing process, the Paint function key will fill in an area with a selected color.

Any square area of the display may be designated for flipping, rotating, moving, or copying. Moving and copying are very fast; flipping and rotating are tiresomely slow. Text may be placed anywhere in the drawing by whacking another function key.

The drawings may be saved in two ways: as "symbols" or as part of a slide show. The slide show may be designated to run in an automatic or manual mode when creating the show.

You are cautioned that touching the keyboard while the program is in the process of manipulating your drawing may have unexpected results. They weren't kidding. Sit on your hands or nibble on some tasty snack—do not touch the keyboard while the computer is at work.

Pits And Stones

A favorite pastime of the Neanderthal, this game has been updated from the original treetrunk with prune pit peripherals to your local computer video. It is played on a board with fourteen holes (pits). One large pit on each side is the home base for each player. The object of the game is to move stones from one depression to another, trying to capture your opponent's stones and maneuver them into your home pit.

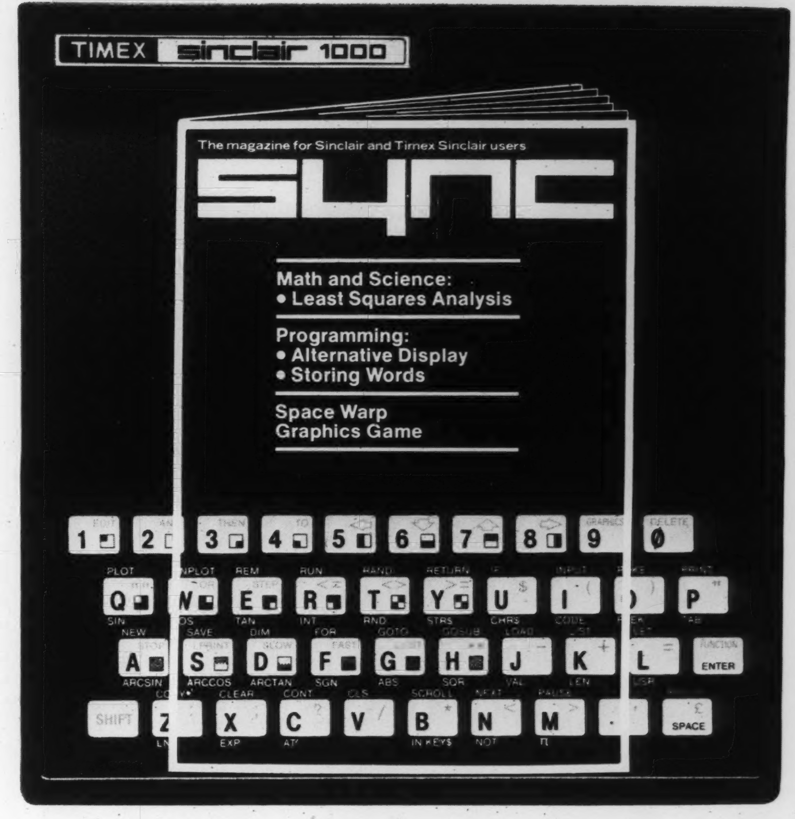
The game begins with the same number of stones in each pit, and the difficulty level rises quickly with the number of starting stones. This is a very colorful game, and the action is reasonably rapid—no computer mumbling "I'm thinking" in this game. There is an incredible amount of noise, raucous tune-playing, and other sound effects; children seem to like this but adults immediately lunge for the DEL key, which turns off the racket.

The simple levels are easy enough for kids, but adults will have a hard time with the upper levels. The graphics are very good, if you like smiley faces; the disk has a five year/50,000 game warranty, and is not copy-protected. It can be played on any type of monitor, and will make a pleasant change from *101 Monochrome Mazes.* It is available from Orion Software.

Pits and Stones

Clutter

This is another game which can be played on a monochrome or color monitor, and it is a delightful one. The general idea is to deflect a photonic ghost hunter, in the form of a little square, into a ghost, thereby vanquishing same and gaining points. The deflection is done by



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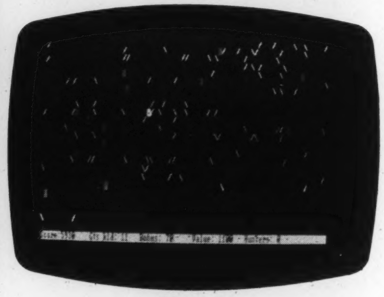
IBM Images, continued...

placing mirrors (slashes) in the way of the hunter.

Once a mirror has been placed, it remains there forever. This is not a problem in the beginning, but after a few minutes the display is full of the little things, and the hunter is caroming all over the place. Every time a ghost gets hit, a black hole appears to replace it. These don't go away either, and if your hunter falls in one, its good-bye photonic ghost chaser.



Clutter

There are three levels of difficulty, the easiest of which has a gigantic ghost that is almost impossible to miss. This game is unusual in several respects. First, it is one of the few games whose sound effects are so charming that I don't turn them off. Second, the game comes with five preprinted labels for your backups. Third, it is written in uncompiled Basic, and yet the action is fast and fun. Starside Engineering has a very pleasant attitude towards copy-protection, and their low-key explanation is a nice change from the usual page of legal intimidations.

For The P-System

Another book on the p-System arrived in my office this month and it is destined to be the classic on this operating system. *Personal Computing with the UCSD p-System,* written by Mark Overgaard and Stan Stringfellow and published by Prentice-Hall, is by far the best exposition on the p-System I have ever seen.

It is written in an entertaining and coherent fashion, and addresses almost every facet of the formidable number of commands and utilities available. A tutorial is provided for getting started which is mostly an introduction to the filer, editor, and compiler.

The remainder of the book is a detailed reference text (although it still reads very well) and has numerous appendices which finally explain some of the mysterious error messages that appear every so often (or more often than preferred, actually). There is also specific information on the IBM p-System, as well as on the Osborne Executive and un-Executive version.

It is an outstanding and comprehensive book for anyone using this operating system—beginner or otherwise.

Stocking Stuffers

Siechert and Wood, Inc. offer a beautifully designed set of tabs for DOS and Basic manuals; they are available for all the DOS variants and their respective Basics. I have only seen the set for DOS 1.1, which consists of 16 tab cards, eight each for DOS and Basic, printed on heavy card stock with sturdy plastic tabs. They made excellent use of each insert, which lists all sorts of handy summaries of command sets and instructions. Although fairly expensive at $9.95, they are a timesaver.

Preprinted tiny labels for function keys, or any other part of the IBM you want to name, are available for 25 cents apiece from David Tlusty. You must enclose a stamped, self-addressed envelope and specify what you want on the label. The order is mailed the same day it is received.

Microsoft Goes to Hollywood

This is a test. See if you can fill in the blanks below.

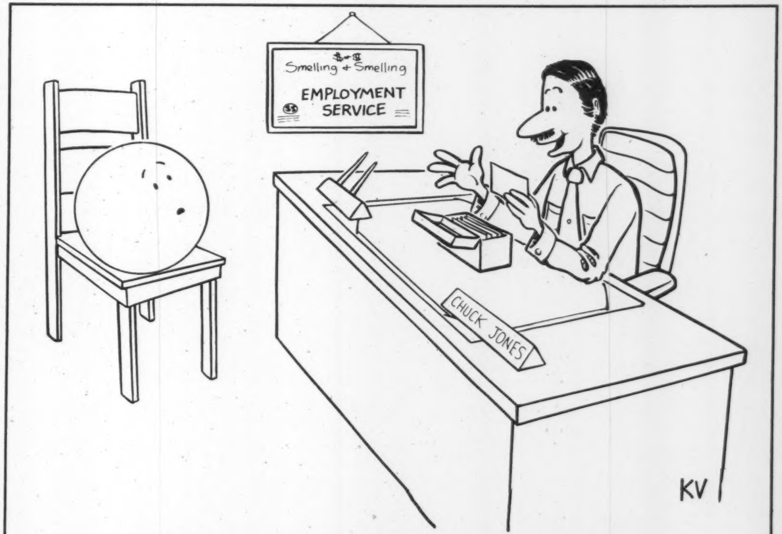
Hollywood	Microsoft
Jaws 1.0	___ 1.0
Jaws 1.05	___ 1.05
Jaws 1.1	___ 1.1
Jaws 2.0	___ 2.0
Jaws 3.0	___ 3.0
Son of Jaws	Son of ___

If the bookshelf you reserve for operating system manuals runneth over, you probably had no trouble with this little quiz. By early fall, Microsoft plans to release version 3.0 of the metamorphic MS-DOS.

Version 3.0 will be multi-tasking, that is to say you will be able to switch back and forth between *SurlyCalc* and *Galactic Geraniums* without exiting to the operating system and reloading a program.

It is also rumored to be upwardly compatible with Xenix, Microsoft's version of Unix, such that programs which run under 3.0 will also run under Xenix. The Xenix environment is, among other things, a multi-user operating system and is presently available for the Apple Lisa and a few other 68000-based computers. It is so large (8 Mb, to be precise) that I understand it will be sold in chunks so you may decide which pieces of Xenix are most appropriate for your system. It seems that we have been toiling up this upwardly-compatible-with-Xenix mountain ever since DOS 1.0 appeared on the shelves. I wish they would hurry up and get it over with.

It is still unknown whether IBM intends to release 3.0 under its imprimatur, but Microsoft is taking the view that there are so many 8086/8088 clones around that the time has come to give them software support. A new department has emerged at Microsoft with the title of Independent Vendor Support. The intent is to work with those vendors who wish to adapt MS-DOS and its supporting software to their machines.



"Well this one doesn't sound too bad if you don't mind running around a maze eating dots and dodging ghosts."

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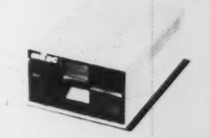

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IBM Images, continued...

Microsoft is also now in the business of selling their generic MS-DOS language compilers directly to the end user. When I visited Microsoft in July, Fortran ver. 3.10, Pascal ver. 3.11, Lisp ver. 4.0, Basic, Business Basic, Cobol, and C were all being shipped in cleverly designed plexiglass boxes.

This is a fantastic idea (the compilers, not the boxes) for a couple of reasons. First, Microsoft, because it is smaller and less ponderous than IBM, could theoretically fix problems (read: bugs) in a more timely and responsive fashion than is now customary.

The problem of updates was brought to our attention rather abruptly when we discovered that our local IBM Pascal Compiler refused to operate under DOS 2.0. How to remedy this little situation was discovered in an obscure appendix in the DOS manual. By providing real end-user support for these types of problems, Microsoft will be performing an act of public mercy.

Secondly, an IBM user will now have a wider choice of language compilers. For a long time, if IBM chose not to release a language for the PC, users did without. Since Microsoft compilers are now available in software stores, they can be purchased by anyone.

The drawback of this generic software is that it is not customized for the IBM (or any other machine for that matter). So, while a program written for one machine will be transportable to another, no advantage will be taken of the spiffy little features of each computer.

The Lisp compiler (version IV) will have routines for customization, but this language is not Microsoft's own, (they bought it elsewhere), and I don't know if the customization program was added on by Microsoft. I hope that all of their compilers will incorporate some configurator; this will eliminate a lot of resistance to generic software.

I had a chance to try the new *Multi-Tool Word* package, complete with mouse, while I was out there. The mouse requires a bit too much coordination for my taste; it is far easier to hit a key than aim a little plastic rodent by rolling it around on a desk top. The device will be swell for daredevil pilot types with clean desk tops, however.

The word processor itself has 65 different type fonts built into it. The formatting capabilities of the program will present the text on the screen in the chosen type face, which is nifty to see. It obviously won't do you any good to select Times Roman type, if the printer won't handle it.

I now have a Compuserve number (71056,727) and will check EMAIL messages on a weekly basis. You can also leave a message with the MUSUS SIG, if you are a member. MUSUS serves members of USUS, the p-System users group.

The membership fee entitles a member to receive newsletters, access the MUSUS software library and exchange war stories with other members. Information on USUS and MUSUS is available from:

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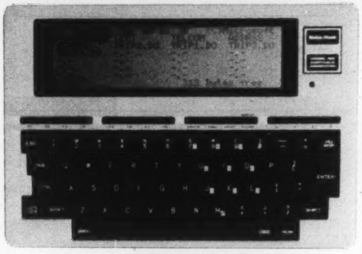

Notebook Computing

David H. Ahl

This is the first column in what will be a periodic series, although not necessarily monthly. In it we will bring you news of new computers, peripherals, software packages, and books in the category of what is loosely known as notebook computers. These include such machines as the Radio Shack TRS-80 Model 100, NEC PC-8201, TI CC-40, and Epson HX-20.

Five other manufacturers were showing notebook-size computers at the summer Consumer Electronics Show, so we expect to see increasing competition in both price and features in the near future.

Model 100/PC-8201 Compatibility

If you read the sidebar to the review of the Model 100 in the August issue, you know that the Model 100 and NEC PC-8201 are virtual twins. The Model 100 is slightly smaller, has built-in graphics characters, built-in modem, 880 fewer bytes of overhead, and address and scheduling programs not found on the 8201.

On the other hand the NEC 8201 has ten function keys (including KILL), cursor control keys laid out in a logical diamond pattern, on-screen editing within the Basic language, user-definable graphics characters, a LOCATE command for graphics, a side expansion connector for external memory cartridges, and a tape of utility and demonstration programs included.

For communications, the edge goes to the Model 100. Also, if you have need of the name and address or the scheduling package, the Model 100 comes out ahead. However, for programming, the NEC is the clear winner. For text editing, the 8201 also has a slight edge as a result of a nice print formatting program included free.

However, that raises another issue. Software is beginning to appear for the Model 100 and there are several packages for the NEC available in Japan. Since the machines are virtually identical, can software for one be used on the other? Well, yes and no.

Programs written for one machine will run on the other, as long as they do not use the LOCATE command (available only on the NEC). However, cassette tapes for one machine will not load on the other. So if you want any of the wonderful NEC games or utility programs for your Model 100, or vice versa, you must get a program listing somehow, and type the program in on your computer.

We have talked to some software companies who tell us they plan to release tapes for both computers, but not all suppliers plan to do this.

SilverWare Games

The folks at CLOAD who produce monthly cassette "magazines" for other Radio Shack computers have decided to broaden their horizons by going into software for the Model 100. Their first package is called *Games #1* and has four games.

Blockade is similar to the old Atari VCS game, Surround. Two players each have four keys with which to control a constantly-moving snake. Each player has two objectives: eat morsels of food that appear randomly on the screen, and cause the opposing player to run into the wall or either snake (all of which are lethal). Points are awarded or lost for each action. The winner is the first player to amass 100 points.

The game can be played by a single player in a sort of "practice" mode. The game has three speeds, slow, medium, and impossible.

We found the controls somewhat unresponsive, probably because the program does not sample the keyboard often enough. This, coupled with the small playing area, made the game a bit of a disappointment.

Reversi is the game sold commercially as Othello. This is a one- or two-player game although in the two-player version, the computer is simply taking the place of a playing board. In the one-player version, you play against the computer.

None of us here is a world class Reversi player, so we cannot judge how well the program plays. It has only one skill level which provided more than enough challenge for us; our won/loss record was about 50-50.

The other two programs are both adventures: Frankenstein Adventure and Alexis Adventure. They are fair-size programs (15,000 bytes for Frankenstein and 18,500 bytes for Alexis). This pushes the capacity of a 24K Model 100, but is relatively small compared to the 48K adventures for other personal computers.

As adventures go, these are relatively straightforward and on a manageable scale. For example, Frankenstein Adventure has 16 locations and about 10 or 11 "problems" to be overcome. Directions (go north, go east) and the Look command can be abbreviated to single letters, while two-word commands can be shortened to four-letter abbreviations.

The vocabulary is relatively small, and if the program is looking for the phrase UNLOCK DOOR, you can express it in a dozen different ways, but for your efforts get only, "I don't know how to do that."

It is not always easy to understand what the program is trying to tell you. For example, we were in a room with "a bookcase, a writing desk, and a pen holder." We told the program, OPEN DESK (your input must be all upper case), and the program told us, "I don't see it here." Hmmmm.

Nevertheless, the adventures were good fun. They provide a nice diversion while travelling when you have too little time to start a serious project and too much to twiddle your thumbs.

The *Games #1* package costs $24.95 from SilverWare, Box 21101, Santa Barbara, CA 93121. (805) 966-1449. ☐

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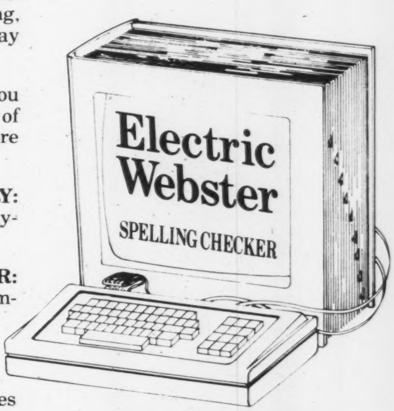

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Apple Cart

Stephen Arrants

For the past two weeks, I've been spending almost all my time trying to set up a communications link with our New York office. Currently, we send material to be typeset from Morris Plains to New York by courier. When you work with the tight deadlines we have, getting something typeset even a few hours earlier can help. Well, the lines are up, and we are plugged into the computer in New York. After endless tests of the modem, terminal software, and telephone lines, everything seems to work. Which brings me to the topic of this month's column.

Telecommunications

A Foreword into the Past

Around the same time Babbage introduced his Analytical Engine in 1822, Andre Ampere experimented with various concepts of communication involving signals sent over electrical wires. Samuel Morse took Ampere's idea and his friend Alfred Vail of Morris Plains, NJ, developed the telegraph and the system for transmitting letters and numbers that later became known as Morse code. This was the first step in communication using electrical signals over a distance.

From that milestone to the development of computers, sending information over wires became routine. Different standards evolved over the years, with the RS-232C becoming the standard for microcomputer communication.

As we all know, the Apple is a very open system. That is, almost any peripheral device can be added by simple attachment to the Apple slots. Adding telecommunications capabilities to an Apple is not difficult. There are three things you must consider: hardware, software, and what you want to access. The answers to these questions may seem complicated, but it is really quite simple. Let's take a look at the options available to you.

Hardware

You really need concern yourself with only two pieces of hardware. You need a peripheral card to communicate with the outside world and a way to get signals to and from your Apple. Almost any RS-232C serial card will work in telecommunication applications. This card allows data to be transmitted to and from your computer in a standard fashion. Connected to that card is a modem, or modulator/demodulator.

A modem takes the electrical impulses from your computer, converts them into sound, and sends them over a telephone line. It also takes the sounds coming from another computer and converts them into electrical impulses that your Apple can understand.

Modems are either direct connect or acoustic. A direct connect modem offers more reliability and versatility because there is nothing between it and the phone line. It can also answer the phone automatically, if another computer is calling you, or automatically dial another computer. Direct connect modems plug into your telephone, usually in the back, where the phone connects to the line. If you wish both the phone and the modem connected, buy a telephone jack doubler, a device that fits right into the receptacle behind a desk phone and give you two receptacles—one for the phone line and another for the modem connection. With the deregulation of the telecommunications industry in the past few years, permission from Ma Bell is not needed.

One thing to consider when purchasing a modem is speed. Most electronic bulletin boards, on-line information services, and other computers communicate at 300 baud. Baud is a unit of transmission, sometimes defined as bits-per-minute. The term takes its name from Baudot, an early pioneer in telegraphic comunications. Three hundred baud will serve almost everyone's needs. Twelve hundred baud is growing more popular, but not every local bulletin board offers this speed. Since many commercial information services impose high surcharges when 1200 baud is in operation, you end up paying about the same amount whether you stay connected for 30 minutes at 300 baud or 10 minutes at 1200 baud.

Consider the "cleanliness" of your telephone line. Errors tend to become more serious at higher rates of transmission. But if 1200 baud is what you want, make sure it is Bell 212 compatible. It should say this on the packaging or advertising. Do not get a Bell 202 compatible modem; this protocol isn't used frequently and can cause trouble when your call is routed through a satellite.

You can buy a modem separately or as part of a software package.

Data in the form of characters are encoded into bits. Length can be either 5, 6, 7, or 8 bits, because of the various standards that have arisen over the years. Each bit is transmitted as a pulse across the phone lines, each pulse having a defined duration. At the receiving end, the other computer must be synchronized to the pulses sent. It must know when a bit starts, how long it is, and when a character starts and stops.

Microcomputers use asynchronous operation. That is, characters can be thrown onto the transmission line in almost any fashion; timing is not important. But transmission must be at a fixed rate and must be framed with start bits and stop bits. These bits delimit a character, providing a check on what is sent.

Also involved in this error checking is parity. When data are transmitted, errors can occur if the line is "dirty." This can cause an extra bit to be included in a character, causing a parity error. To guard against such problems, a parity bit may be appended to the word sent, making the total number of binary ones in the word odd or even, depending upon the type of parity chosen. An extra or missing binary one will tell the computer that an error has occured. Depending on your software, the computer may ask for that specific word or character to be resent or flag it for later examination. Parity may be odd, even, or absent.

Software

What you want to do will have bearing on what type of software you should consider. If you just want to transmit what you type rather than capture or send files, "dumb" terminal software is what you need. This bare-bones software is cheap and easy to use, but severely limited in scope. You can't download files, capture data for printing out hard copy, or do much else. Smart terminal software isn't much more expensive, and the added features are welcome. What features should you expect?

All smart terminal software should allow the transmission and capture of disk files. For example, suppose you see a terrific new utility in the download section of a bulletin board. Transferring it to your Apple disk drive is certainly much easier than copying the program by hand and

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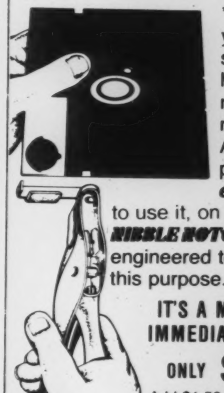

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then typing it into the Apple.

Let's say that you want to place a public message on many boards. Why spend time typing it over for each board? Why not save it as a text file and transmit it with one keystroke?

Having the ability to interrupt the data capture at any time can prevent host prompts and commands from being saved to disk. Suppose that the program you are capturing has special control codes or commands that might make a mess on your computer? The ability to flag for later editing or change them to harmless or more meaningful characters is a feature you should look for.

Pay attention to the file transfer protocols that are offered. You must have identical software for transfer to work. What a protocol does is use an accepted way of functioning. It uses a specific length of data for each transmission block sent or received. If a block sent does not match an agreed upon figure, a protocol error results. The receiver then tells the originating computer to send the block again. Many protocols exist. The closest thing to a standard is called the Christiansen protocol, also known as Modem, XModem, or CP/M standard. It is the most widely used protocol among microcomputer systems, though others are used.

Other useful features include access to DOS commands. This is useful if you can't remember the exact file you plan to send, or if you need to delete some files to make room on a disk for a long file. Software that allows storage of macro commands is useful, especially when you use a complicated log-on series. A phone directory that can automatically look up and dial is almost a necessity if you use many services.

Some software allows communication only at 300 baud or less. If you are serious about telecommunications, get a software package that allows you to select baud rate. Sooner or later you may get a modem with 1200 baud capability. Don't let your software lock you in.

Starting Small

Now that you have the hardware and software, what can you do with it? For a start, call up a local bulletin board. These are usually privately run and free, and the interests of their users are almost limitless. There are boards for fantasy game players, photographers, science fiction fans, hardware/software purchase or trade, and on many other topics. Most boards are free form, however. They can include many different interests and philosophies, with few restrictions.

Operators are called Sysops, and they may be available on-line to answer questions you may have or just talk. Often, the board operates on the Sysop's own Apple. Therefore, don't expect it to be up 24 hours a day. After all—there are other things to do with an Apple.

When you dial up a bulletin board, a signal is sent from the host computer to your Apple. After this carrier is received, your modem sends out a signal telling the host that a connection is established. From that point on, you are connected with another computer. Instructions are displayed on your monitor. They may or may not ask for your name, address, phone number and type of computer. A password can be issued that allows for faster log-on and access to restricted parts of the board, such as a download section. Don't give a phony name or phone number. If you want to use a "handle," tell the Sysop in a private message and usually he will oblige.

Get involved in the board. If someone asks a hardware or software question, and you think you know the answer, answer it! A board needs active discussion to survive. Unfortunately, it is rare to have more than one user on at a time. Any discussion that takes place will resemble using the mails.

Quite often, uploading and downloading are available. You can upload to the host and download to your Apple. If you are on a general board—one that isn't exclusively Apple-oriented—there may be programs for the IBM PC, TRS-80, Color Computer, and many other computers. You can download these files if you want, but they will not run on your Apple. Of course, you could save them as text files and translate them into Applesoft if you wish.

A few words about these free programs. First, don't expect to find a copy of *VisiCalc*, or *Lode Runner*. That would be a copyright violation and Sysops are fanatical about keeping their systems clean. Second, you get what you pay for. The programs are frequently undocumented; the descriptions may not match performance; and many may not work at all. Still, I have found a few programs that were worth the time and effort. Rarely, you find a program that is so well-written and documented that you would have paid for it.

For every one or two programs you downloaded, upload one. The program you contribute doesn't have to be the most amazing piece of code ever written. Maybe you have a better way to draw a shape or a new twist on formatting a screen display. If it is a bad program, the marketplace will let you know. Here, though, it is the effort that counts.

Where to start? I have included a list of some BBSs across the country.

For a more comprehensive list, dial up Novation at (213) 881-6880. Though the list they provide isn't complete, it includes

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CIRCLE 192 ON READER SERVICE CARD

Apple Cart, continued...

The following list is not comprehensive, but will give you an idea of some bulletin boards around the country.

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NOVATION	213-881-6880	Lists other systems
DRUCOM	215-855-3809	S
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ABBS	415-881-5662	A
Assembly Line	502-459-5531	A
PMS	503-689-2655	*
CBBS	516-561-6590	R
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FORUM-80	617-692-3973	S
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Send phone numbers to:
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39 E. Hanover Ave.
Morris Plains, NJ 07950

hundreds of different boards. Some BBSs spring up and die very quickly. Don't be discouraged.

Moving Up

If you get tired of the small boards, and you can afford them, there are several large timesharing systems available. The Source, Compuserve, Dow Jones, and Delphi are just a few of the systems available. After using small boards, using one of the large systems makes you feel like a kid in a candy store. There is so much available that you may find it tough to decide where to start.

Don't take too long, though. These systems charge by the hour and hit you with a surcharge if you run at 1200 baud. Rates may be as low as $5 per hour after 6 p.m. local time, rising to about $30 per hour during business hours.

What is available? Well, you can do almost anything: read news right off a wire service (AP, Reuters) or talk with different users in a chat mode or Citizen Band radio simulation. Out of work or thinking about changing careers? Add your resume to a special database or look at the want ads. You can send mail to a friend's account on the system, learn how to program, do some programming, or buy something over the computer.

Games are available on-line. What makes these games exciting is that more than one person can play at a time. You not only play against the computer, but against the other players. Hollywood gossip, a personal advice service, horoscopes, and other forms of entertainment are available.

Perhaps the most useful features are the Sigs or Special Interest Groups. These are bulletin boards and discussion sections revolving around one interest. There are Sigs for feminists, automobile collectors, science fiction fans, and an almost limitless number of other interests. These Sigs are not run by the timesharing system, but by the people in the Sigs.

Well, I think that that is enough information to give you a start. Let me know if you discover an unusual BBS. From time to time we will publish telephone numbers of boards across the country.

Letters

To Lisa Handley of West Palm Beach, FL: As a general rule, the files generated by one calc-type program may be successfully transferred to another if the data are saved in DIF format. DIF, or Data Interchange Format, is the format that *VisiCalc* files began using. Many other calc programs, such as *MagiCalc* and *SuperCalc*, allow their files to be saved in this format. As always, ask your dealer if the particular package you are considering allows for DIF file storage.

To Donald McInerney of Dearborn, MI: I use *Apple Writer IIe* and I haven't experienced the problems you mention. Perhaps you are losing letters because you do not strike each key completely. Is anyone else experiencing this problem? Do you strike a series of keys and find letters missing?

To James Workman of Zanesville, OH: Here is how to delete that space after underlining in *Apple Writer IIe:* Embed a CONTROL-H after the underline token, and punctuation marks will immediately follow the underlined text. The sequence is CONTROL-V, CONTROL-H, CONTROL-V. That's all there is to it!

To all who have written about trading up to an Apple IIe: I'm sorry, but I cannot put you in touch with a dealer offering this service. The retail market changes very quickly, and even if I knew a dealer offering trade-ups in your area, the dealing period would be over by the time my reply reached you.

Future Cart

Next month, a report on the September survey. I'll print your answers, questions, comments, and complaints (none so far!). Keep those surveys coming in. I read each one and take your suggestions seriously.

This morning, I saw a demonstration of *Supersprite*, a peripheral card that allows the creation and use of sprite graphics on the Apple. I couldn't believe what this card did. It is one of the most innovative and exciting Apple peripheral cards to come along in years. I'll have a review next month. Also reviewed will be Key-Wiz, a special keyboard that can be configured for your own needs. ☐

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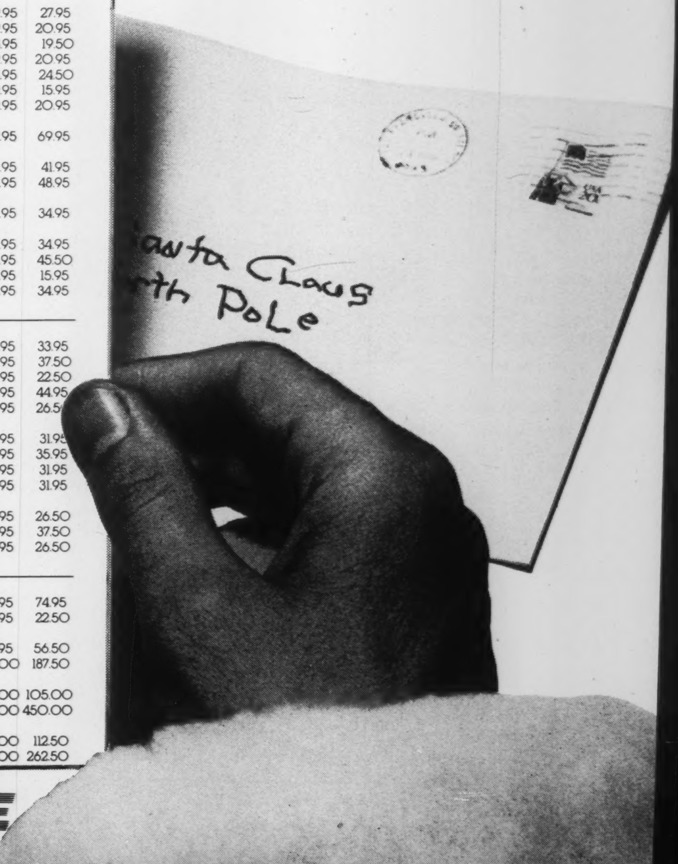
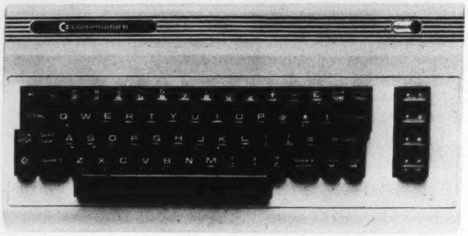
CIRCLE 197 ON READER SERVICE CARD





Commodore's Port

John J. Anderson

First off, keep those cards, letters, and especially manuscripts rolling in. I have been quite favorably impressed by the overall quality of the Commodore submissions we have been getting. At this rate, the *Creative Commodore* programming books will be among the strongest available for any micro around. Keep up the good work, folks.

Let's make a brief diversion to the mailbag. Mike Steed, of Provo, UT, wrote in with the following fix:

"In the July 1983 issue on page 176, Eric Luce and James Wheeler presented an excellent program using redefined characters on the Vic. To make room for the characters, they moved the start of Basic to $1801 (6145 decimal). This is very handy, except for one thing. The RUN command without a following line number, and NEW, will return an error message.

"This can be prevented quite easily. For some strange reason, Vic-20 Basic requires a zero byte at the start of Basic minus one.

"So, to remove the error message after those strange POKEs, add POKE 6144,0 to line 30 in listing 1, preferably before the NEW. Also, add the same command to both of the immediate-mode sets of POKEs."

Okay, Mike, we will do so.

Still Seeking Resolution

We have also received many responses to our piece on Commodore 64 video resolution. A few monitor owners wrote in with the same fix as Mark Kuene, of Eau Claire, WI. Mark stated the following:

"I recently bought a Commodore 1701 color monitor for my Commodore 64. Unfortunately, when I used the two-cable jack supplied with the monitor, light vertical lines appeared on the picture. This problem is described in the August 1983 Commodore's Port.

"The problem can be remedied by using a three-jack cable connected to the optional three-jack input on the back of the 1701 monitor. The same five-pin DIN jack can be used to plug into the 64, but the cable will have a separate *luminence* line added.

"Connect the luminence output of the C-64 (pin 1) to the jack labeled LUMA, the video output (pin 4) to the jack labeled CHROMA, and the audio output (pin 3) to the audio input jack. A pin-out diagram is shown on page 142 of the Commodore 64 User's Guide.

"Through the addition of the luminence output, a much sharper picture is obtained, the colors are purer, and the troublesome vertical lines are eliminated completely."

Thanks, Mark. Speaking of the Commodore 1701 monitor, I recently saw a retail price of $240 for the unit. This has got to be one of the best prices around for a quality NTSC monitor. And if you have C-64, it is the only logical choice. What a difference it makes in video quality.

Nonetheless, we have gotten many letters from disappointed owners of C-64s, some with color monitors, suffering from a problem *Compute* magazine recently christened "sparkle." This glitch results in a distracting glitter effect across the screen. One of the 64s we have here at the lab has a really bad case of the sparkles, for which *Compute* faults a ROM problem. It makes certain programs very hard to watch, and certainly spoils many graphic effects. Even text screens are affected. At press time, Commodore had yet to officially acknowledge the problem or state when a fix would be available.

Rest assured we will keep a close eye on the Commodore video story and update it again soon. As soon as a sparkle fix is available we shall report on it.

The Key to the Commodore Keyboard

When you take your new Vic-20 or Commodore-64 computer out of the box, the keyboard of the machine immediately offers a challenge. Staring at it, you can almost hear it say "I dare you to make me do something."

Of course you can make it do things without learning much about the keyboard. You might choose to learn only the commands that load prepackaged software into the machine and get your C-64 or Vic-20 to do some neat things. But if you want to do more, you will have to learn more about the Commodore keyboard layout.

The keyboards of these machines are easy to learn, but have their little tricks. Sometimes something works one way, then later in another, leaving you perplexed as to why you can or cannot get certain keypresses to work.

Another aspect of the keyboard that can be confusing is the concept of special graphics characters. They have their own special meanings and are sometimes hard to find on the keyboard. This kind of problem often surfaces when you are typing in a listing from a printed source.

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CIRCLE 136 ON READER SERVICE CARD

Commodore's Port, continued...

You know what the character is, but you don't know how to get it to appear.

Boston Electronic Systems Training has released a keyboard tutorial, called *Best Keyboard Coach,* for the C-64. It uses an audio cassette, along with animated color graphics programs, to provide painless familiarization with the Commodore keyboard. A second program offers interactive drill and practice.

At $20, I can't think of any beginning C-64 owner who would want to do without it. As I have said, getting past the keyboard is the first real hurdle. For more information, contact Boston Electronic Systems Training, Inc., 24 Munroe St., Newtonville, MA 02160. (617) 969-2378.

About the most common questions we get about Commodore computers concern keyboard problems. Let's hold a short tutorial on the subject right now. Even if all that follows seems utterly simple to you, try reading it through. It might help clarify things in the long run.

When you turn on your Commodore machine, it defaults to the caps mode. In this configuration all letters are printed out as capital letters. Shifted characters print out as special graphics shapes, as depicted on the front righthand side of each key. Make sure you are always in this mode when programming. Otherwise you can end up making things tough on yourself or others later.

The other mode you can choose is

Figure 1.

Character	Description	Function	How to get it	CHR$
♥	Inverse heart	Clear screen and home cursor	SHIFT — CLR	147
R	Inverse R	Turns inverse on	CTRL — 9	18
▁	Inverse underline	Turns inverse off	CTRL — 0	146
▌	Medium block left of center	Black	CTRL — BLK	144
E	Inverse E	White	CTRL — WHT	5
£	Inverse British pound	Red	CTRL — RED	28
◥	Inverse right triangle	Cyan	CTRL — CYN	159
▚	Half-checkered half-solid	Purple	CTRL — PUR	156
↑	Inverse up arrow	Green	CTRL — GRN	30
←	Inverse left arrow	Blue	CTRL — BLU	31
π	Inverse pi	Yellow	CTRL — YEL	158
♠	Inverse spade	Orange	C= — BLK	129
◢	Bite from lower right	Brown	C= — WHT	149
☒	Large inverse x	Light red	C= — RED	150
○	Inverse donut	Dark gray	C= — CYN	151
♣	Inverse club	Medium gray	C= — PUR	152
▐	Inverse vertical right of center	Light green	C= — GRN	153
◆	Inverse diamond	Light blue	C= — BLU	154
┼	Inverse cross	Light gray	C= — YEL	155
│	Inverse vertical down the center	Cursor left	SHIFT — ⇐CRSR⇒	157
]	Inverse right bracket	Cursor right	⇐CRSR⇒	29
●	Inverse circle	Cursor up	SHIFT — ⇑ CRSR ⇓	145
Q	Inverse Q	Cursor down	⇑ CRSR ⇓	17

lowercase, which is turned on and off by pressing the SHIFT and Commodore logo keys simultaneously. The screen characters will then resemble those on an ordinary typewriter, with capital letters appearing when SHIFT is pressed.

To get the graphics characters on the lefthand side of each key front, press the Commodore logo key along with the key that depicts the shape you want. That's all there is to it.

But not every graphics character is depicted on the keyboard itself. There are some mysterious but especially powerful ones you should get to know, and you will, quite soon.

Why problems occur if you program in the lowercase mode will become obvious if you look at mixed caps and lowercase text from the caps mode. All the capital letters will have reverted to graphics characters. I once wasted a great deal of time trying to load a file name with caps that had been entered from the lowercase mode. File names with graphics characters in them are rather inconvenient to type.

This problem may also drive you crazy looking for graphics characters when typing in a program. Stay in the caps mode, unless there is a very good reason to go to lowercase. A good rule of thumb is to use the lowercase mode only when *running,* as opposed to *editing* a program. If you are editing lowercase text, shift back regularly.

You may also have noticed that something funny happens after you type a quotation mark. When the Commodore editor sees a quote, it puts the computer into what in other machines is called an "escape" mode. That means that rather than executing a keyboard command, it puts the message to execute that command into a print statement within the very program you are typing. If it sees a second quote, it returns to normal.

Outside a quote, CTRL-BLK will turn the cursor, and all subsequent characters, black. Inside a quote, a special character will be inserted, which tells the machine upon *execution* of that line to turn the cursor black.

This is where all the mysterious special characters come into play when typing program listings. It takes more than just a little while to get to know these characters when you see them, let alone what they mean and how to obtain them. But my suggestion is to work on it. There are only 22 really important ones. At the least, learn to recognize them.

Figure 1 is a listing of the prevalent ones, and how to get them to happen on the keyboard. Consider cutting out Figure 1, gluing it to some card stock, and keeping it near your computer.

You will also notice that the last column in Figure 1 gives a special numerical code for each character. In some program listings, these CHR$ numbers are used rather than special graphics characters. For example, instead of printing an inverse heart to clear the screen and home the cursor, you might say PRINT CHR$ (147) to accomplish the same task.

Although this technique avoids the use of graphics characters, it makes program listings harder to understand—unless you know which codes are which. I think it is easier to associate a graphics character with a special command than a number. For that reason I avoid this approach in my own programs. However Figure 1 is a good reference to consult when you see CHR$ commands in other programs.

So you see, the secrets of the Commodore keyboard are not difficult at all once you learn what they do and why. My advice is to start experimenting.

Next month, among other things, we shall examine wedge programs for the Vic-20 and the 64, and see how they can make life much easier for the Commodore computer owner. See you then!☐

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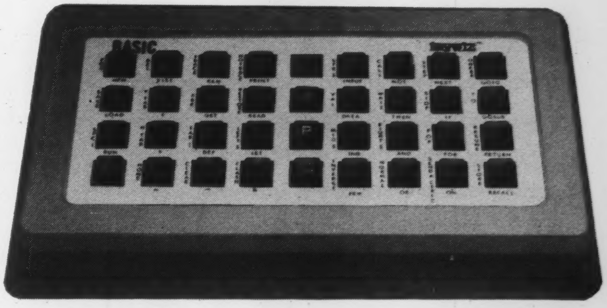
(ALL 248 OF THEM!)



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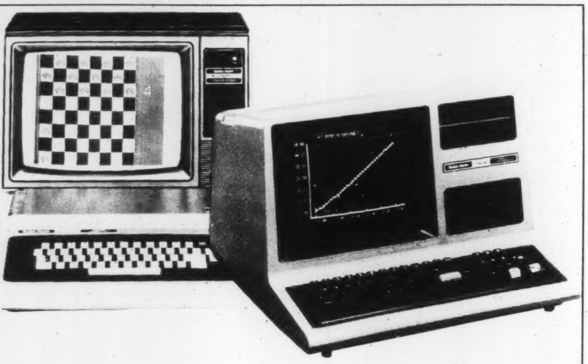


TRS-80 Strings

Stephen B. Gray

Looking at the fifty-seventh variation on a TRS-80 theme, we see that it consists of a single subject: the *Profile III Plus* database management system, which has been called "probably the greatest program Radio Shack has released." Plus a short program that lets you twinkle a little.

Profile III Plus

Many personal computer owners use their machines mostly or entirely for word processing or "electronic filing," an office-of-the-future phrase for the storage and retrieval of data with the help of a computer.

For the TRS-80 user, Radio Shack offers the *Scripsit* and *SuperScripsit* word processing programs. For personalized electronic filing, Radio Shack has the *Profile* database management system, or DBMS for short.

Profile was first introduced for the TRS-80 Model I and III in the RSC-4 catalog dated 1981: "Stores information of any kind. Keeps track of names and addresses, records, or even personal references. You can specify both display and printout formats. Powerful editing features make changes easy. Files can be interactive with simple Basic Programs. (32K, one disk) . . . $79.95."

Profile II, for the TRS-80 Model II, was introduced in the same RSC-4 catalog. At $179, it stores more records than the I/III version and is more versatile. *Profile II* stores up to 99 data fields in a single record, and stores up to 3000 records with a one-disk Model II/12 system. Files can be searched by any one of 36 user-defined fields.

Profile Plus for the II/12 is an expanded version of *Profile II,* with many extras, priced at $299. It permits arithmetic operations between fields, with up to 16 equations of 63 characters each. Among the many advanced features of *Profile Plus* is selectable record lengths, which prevents wasted disk space.

The $199 price of *Profile III Plus,* for the III/4 with two disk drives and at least 48K of memory, reflects its use of most of the *Profile II* features. It stores up to 2500 one-segment, 100-character records. Records can be 1020 characters long, with up to 99 fields per record. Up to 36 search fields can be defined by the user.

Profile for the I/III is still available at $79.95, but is now described as "ideal when changes are infrequent."

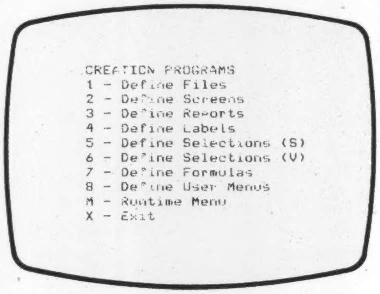
The $299 hard disk version of *Profile III Plus* increases the number of records in the system and offers extra sorting features.

Setting Up a Database

The *Profile III Plus* manual shows in great detail how to set up a database, using as an example a company whose salesmen sell encyclopedias.

Defining Files

The package comes with two disks. Insert the Creation disk in drive 0, and the first display is the Creation menu which offers eight "create" functions for setting up and designing layouts for databases.



```
CREATION PROGRAMS
1 - Define Files
2 - Define Screens
3 - Define Reports
4 - Define Labels
5 - Define Selections (S)
6 - Define Selections (V)
7 - Define Formulas
8 - Define User Menus
M - Runtime Menu
X - Exit
```

First, tell *Profile III Plus* what information you want in your database (called a file in this DBMS), and what names you want to give it. You start with item 1, Define Files.

The display asks you to:

Enter File Name

so you type:

SALESMEN

and press ENTER. Eight spaces are available for database names.

The display then asks you to:

Mount RUNTIME Disk

so you put it in drive 1. This will eventually contain all the display screens, report formats, label formats, and user menus you generate with the Creation disk. Once the Runtime disk is completed, you no longer need the Creation disk to use your new database.

The display asks if the file is new. Press Y and ENTER, and this question won't appear again when you work on the Salesmen database.

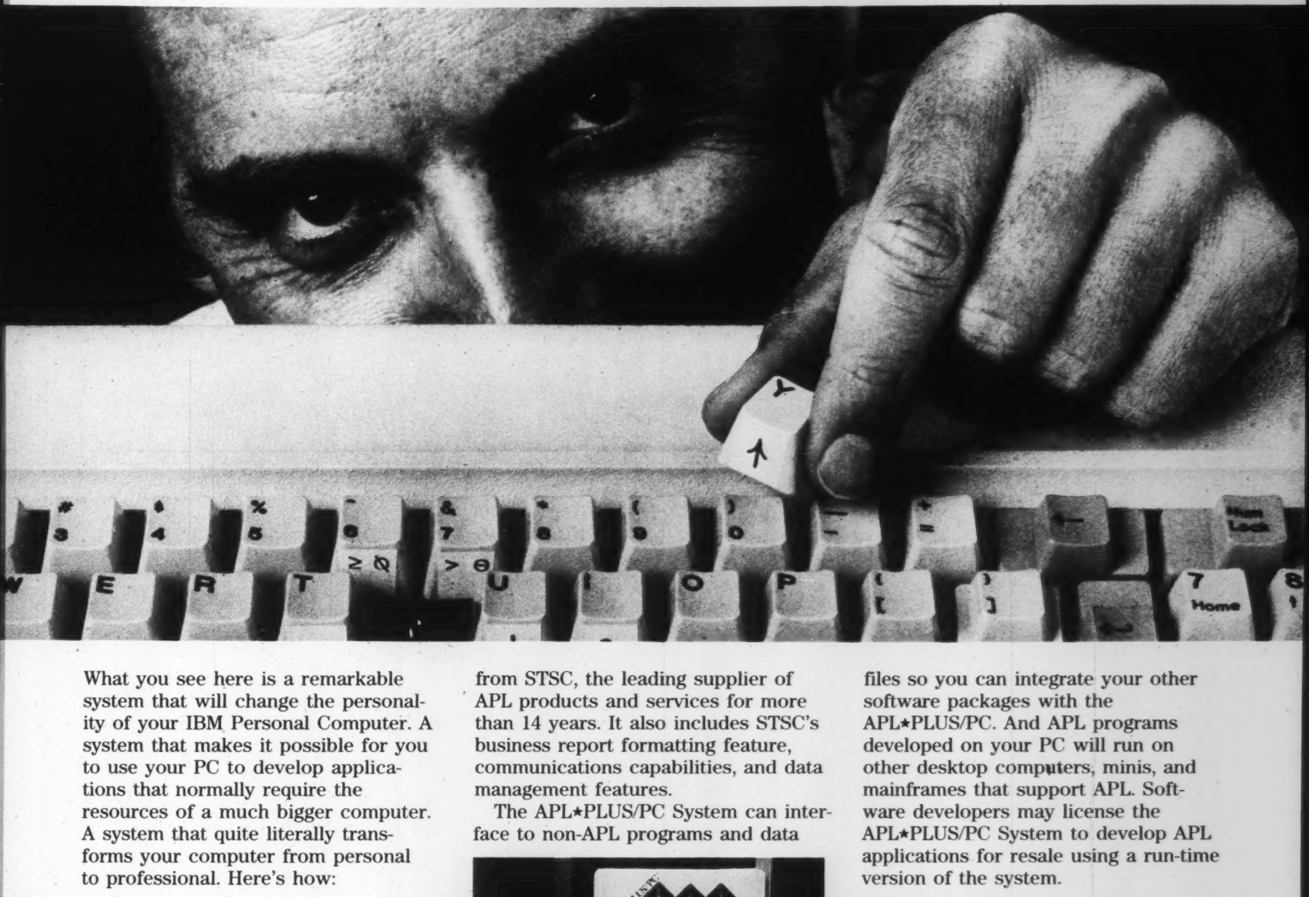
The screen shows:

File Currently Contains 0 Segments

Enter Segment # (1-1)

A segment consists of the related

PULL. PULL. STICK. STICK. CHANGE PERFORMANCE THAT QUICK.



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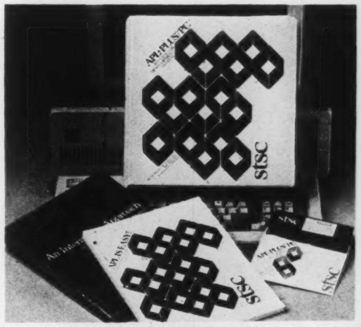

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fields that contain data. One segment might contain name, address, and phone-number fields, while another might contain a spouse name, hobbies, and other such fields.

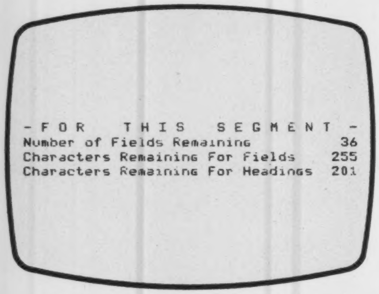
You can have up to four segments in each *Profile III Plus* database. This lets you spread the data over four disk drives, if you wish. The first segment is the most important. The fields you enter into this segment, called the Key segment, can be used later as search and sort fields to retrieve individual records. Segments 2 through 4 contain data only.

Salesmen contains no segments at this point. You can only enter Segment 1. Later, when you have defined other segments, the numbers in parentheses change to let you access any segment you have defined or let you create a new segment.

For example, with two existing segments in a database, the parentheses show (1-3), which means you can access Segment 1 and 2, or create Segment 3.

Defining Segment 1

Type 1 and press ENTER, and the screen shows:



```
- F O R   T H I S   S E G M E N T -
Number of Fields Remaining            36
Characters Remaining For Fields      255
Characters Remaining For Headings    201
```

Below that is a line asking you to enter a field heading. This is the beginning step for setting up a database. At the left of the screen is the field number 1.

The first heading you want to use is the salesman's district, so you type:

DISTRICT

Next you are asked to:

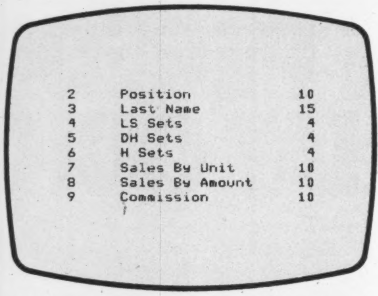
Enter Max Field Length

—the number of spaces you want to be available for entering data in this field. So, after looking through the district names to see how long they are, you type:

10

When you do, the three numbers in the top half of the display change because you have reduced the Number of Fields Remaining (by 1) to 35, reduced the Characters Remaining For Fields (by 10) to 245, and reduced the Characters Remaining For Headings (by 10) to 191.

Now you enter the remaining fields you have chosen for this first segment, along with the maximum field length of each:



```
2     Position             10
3     Last Name            15
4     LS Sets               4
5     DH Sets               4
6     H Sets                4
7     Sales By Unit        10
8     Sales By Amount      10
9     Commission           10
```

The three abbreviations in fields 4-6 stand for Library sets, Deluxe Home sets, and Home sets.

When you have entered all the fields, press ENTER to return to the Creation menu. If necessary, you can review the first segment of Salesmen by pressing 1 and then entering Salesmen, and the screen will display field numbers, headings, and lengths. The bottom of the screen provides four options: Hardcopy (print a list of the defined fields in the segment); Replace (for redefining segments); Add Fields; and Next Segment (to define or review the next segment).

Defining Segments 2-4

Now you define the other segments, adding fields for salesmen's data in Segment 2 (first name, address, phone, date hired, total sales by unit); fields for dollar value of sales in Segment 3 (month by month, with annual total); and fields for volume and dollar amounts for each type of set in Segment 4.

Defining Screens

The next step is to design the way you want *Profile III Plus* to prompt you on the screen for the data required when you enter the data. You can design up to five screens for each database.

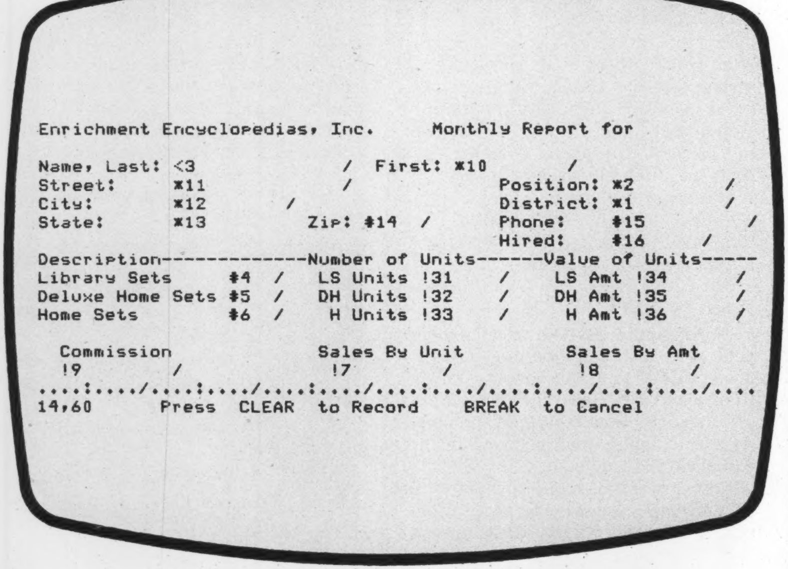
In the manual, you design two screens for Salesmen. One screen prompts for monthly statistics, the other for yearly statistics. So you use a dozen "field indicators" to tell *Profile III Plus* the type of data each field is to contain, such as * for an alphanumeric field, # for a numeric field (accepts only numbers, decimal points, and minus signs), ! for a protected field (contains data that can be displayed but not changed from the keyboard), and so forth.

By the time you have finished designing the first screen, it should look like Figure 1.

Defining Math Formulas

At this point you need to define math formulas to compute values for your screen. So you set up formulas that, for example, multiply the number of Library Sets by the commission. The last formula totals the various commissions.

This is a powerful feature, which allows you to use the four basic math functions to write up to 16 formulas, using up to 20 fields per formula. You can calculate commissions, subtotals, totals, taxes, and so on.



```
Enrichment Encyclopedias, Inc.     Monthly Report for

Name, Last: <3              /  First: *10        /
Street:     *11             /           Position: *2       /
City:       *12       /                 District: *1       /
State:      *13        Zip: #14  /      Phone:    #15        /
                                        Hired:    #16     /
Description-------------Number of Units------Value of Units-----
Library Sets       #4  /  LS Units !31    /    LS Amt !34      /
Deluxe Home Sets #5  /  DH Units !32    /    DH Amt !35      /
Home Sets          #6  /   H Units !33    /     H Amt !36      /

  Commission              Sales By Unit           Sales By Amt
  !9          /            !7          /            !8         /
....:..../....:..../....:..../....:..../....:..../....:..../....
14,60      Press  CLEAR  to Record    BREAK  to Cancel
```

Figure 1. The Monthly Report screen will be used later to enter sales data.

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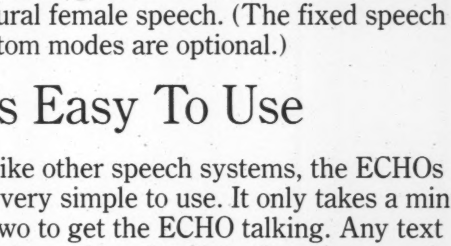

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Each ECHO comes ready to use with a speaker and tutorial-style manual. The ECHO][, priced at $149.95, also comes with a variety of demonstration and utility programs. The new ECHO GP (General Purpose), priced at $199.95 is a stand-alone unit with its own on-board microprocessor; it will interface with any computer through the serial port. All ECHOs have a one year warranty.

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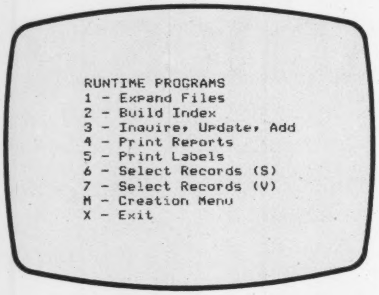
TRS-80 Strings, continued...

Next you design the screen for yearly statistics. Now you are ready to enter data.

Entering Data

During data entry, you don't need the Creation disk; you need only the Runtime disk in drive 0, and any data disk(s) on which you want to store your files in drives 1, 2 or 3. You should, of course, periodically back up these data disks.

By typing RM and pressing ENTER, you call up the Runtime menu:



```
RUNTIME PROGRAMS
1 - Expand Files
2 - Build Index
3 - Inquire, Update, Add
4 - Print Reports
5 - Print Labels
6 - Select Records (S)
7 - Select Records (V)
M - Creation Menu
X - Exit
```

Use selection 1 to create room on the disk to store records, 2 to specify a field on which to sort records, and 3 to run the main part of *Profile III Plus,* where you enter, delete, edit, and search data.

Selection 6 lets you specify a sort field and up to 16 selection fields to select records to merge with *SuperScripsit.* Selection 7 does the same for passing records to *VisiCalc.*

Searching Records

You can use any of the fields entered in Selection 3 (Inquire, Update, Add) to search for specific records or a group of records.

You might want to search for all salesmen whose last names occur alphabetically after Johnson. At the Runtime menu, press Selection 3, enter Salesmen, and type:

Johnson

and a relationship abbreviation. In this case you want all the names "greater than" Johnson, so you enter:

GT

and all the names after Johnson are displayed.

The screen now shows:

Enter Connective (AND, OR, ENTER)

to let you further limit the search. If you type:

AND

you are asked for a second field number, and the data for those salesmen whose names appear after Johnson are searched for a second criterion, such as all those who are over 40. Only those records that satisfy both after (after-Johnsons over 40) are then displayed.

A wild-card symbol (=) makes *Profile III Plus* show you all records that contain anything in a certain field or part of a field. For example, to find everything entered during February 1983, you can scan for:

02/= =/83

Indexing

An indexing feature lets you look through your records in alphabetical or numerical order, using any field from Segment 1. You can start at any point in the database and go either forward or backward. But before you can do any indexing, you must tell the computer which field(s) you want to use with the Build Index program on the Runtime menu.

Report Formats

The next step is to define report formats, for printing reports. *Profile III Plus* lets you define up to five different reports for each database.

You set up the reports very much like defining screens for data entry. You determine what is to be printed where, what totals are to be calculated, and on which fields the data are to be sorted before printing.

Each format can include up to two title lines, three header lines, and up to 66 lines or one or two-line detail information. Reports can be dated, paginated, and printed up to 132 columns wide.

If you want to print labels, such as for mailing letters to salesmen, you also define the label formats.

SuperScripsit and VisiCalc

Selection 5 on the Creation menu is for merging *Profile III Plus* with Model III *SuperScripsit* to print form letters and documents. This creates the familiar "computerized" letter, which can print, in the body of the letter, variable data such as first name, sales figures, and so on.

Profile III Plus allows you to use *VisiCalc* with your databases. You need the *VisiCalc* program disk, of course. You can select up to 16 fields to pass to *VisiCalc.*

Password Protection

Profile III Plus provides your database with limited security. You can use passwords to protect screens, which will not be displayed without the user having entered the proper passwords.

Profile III Plus Manual

The 202-page manual shows in great detail how to create and use *Profile III Plus,* with extensive examples. The last

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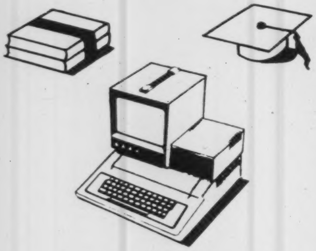

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73 pages consist of a Reference Guide (to check information quickly) and Appendixes (making backups, formatting data disks, printouts of all the Salesmen files, a glossary, and so forth).

Learning By Doing

Although the manual is detailed, you learn almost as much when you try to use the program, as you do reading about it. However, once you get underway, you will be quite impressed by its speed and flexibility. You can easily switch from one component program to another, and screens and report formats are easily designed.

Of course, the first time through takes a while unless you have had some experience with database systems. Even then, you have to become familiar with the *Profile III Plus* way of doing things.

Many little decisions must be made the first time, such as how many spaces to allow for names and addresses, what headings to use for reports, and so on. You must remember how to get from one component program to another. The first time you try to search the files, it may not work, or not in the way you expected, especially if you skimmed over the manual and didn't read all the details.

The Creation and Runtime disks both contain TRSDOS 1.3, which means *Profile III Plus* isn't compatible with any other operating system, if you prefer DOSPLUS or LDOS.

At $199, *Profile III Plus* isn't cheap, but it has a great many advantages, such as convenience of use, interfaces to *SuperScripsit* and *VisiCalc,* password protection, and arithmetic operations.

If you think you need your own electronic filing system, you might want to check out this one at a Radio Shack Computer Center. If you have enough time to understand and appreciate the many sophisticated features of *Profile III Plus,* you will probably want it.

Short Program 44: Twinkle

George Collins' letter, which had no return address, said: "My 13-year-old daughter Dawn was sitting at the TRS-80 Model I, putting dots on the screen. I thought I could use her program to illustrate graphically to her the abstract notion of a random process. The program listed below might be of general interest to young programmers since the dynamic aspect of random processes can be easily visualized. The program randomly sets and resets pixels on the screen for a twinkling effect."

```
10 CLS
20 RANDOM
30 X1=RND(127): Y1=RND(47)
40 X2=RND(127): Y2=RND(47)
50 X3=RND(127): Y3=RND(47)
60 SET(X1,Y1)
70 RESET(X2,Y2): RESET(X3,Y3)
80 GOTO 20
```

Well, not quite a twinkling effect. Twinkling stars change in brightness; they don't turn on and off. This is a problem if you want to produce a twinkling effect with pixels that have only two states: on and off.

Although the program may achieve George's aim, there must be better ways to approximate twinkling stars. George's program sets pixels randomly, then resets some. Note that there are two RESET statements for every SET statement. So can you figure out why line 70 doesn't eventually turn off all the pixels?

Can you write a program that creates a field of stars, then turns off a star and immediately turns it back on again, and does it randomly across the field? Or can you approach the twinkle effect by other methods? Can it be done effectively in Basic or only in assembly language?

Here is a program that provides a twinkle of sorts:

```
100 CLS
110 X=RND(126)
120 Y=RND(46)
130 SET(X,Y)
135 FOR A=1 TO 30: NEXT
140 RESET(X,Y)
150 FOR B=1 TO 30: NEXT
160 SET(X,Y)
170 RESET(X+1,Y+1)
180 GOTO 110
```

However, it twinkles each star only once as it turns on that star.

Call for Shorties

We are running out of short programs for this column, so if you have written a new and different program that might fit here, please send it to me at the magazine.

Computer printouts are preferred, because they are subject to fewer errors. In addition, please explain any tricky lines. □

"It says 'Jump if Not Zero'..."

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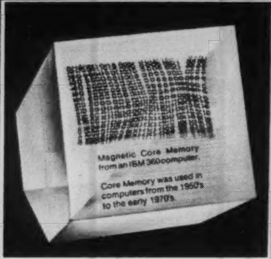
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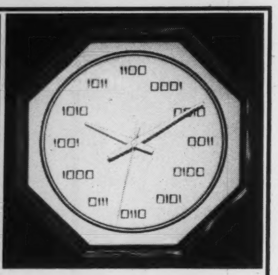

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Book Reviews

Kids And The Apple by Edward H. Carlson. Datamost/Reston Publishing Co., Reston, VA. 219 pages with index. $19.95.

Teachers frequently complain that there is a lack of good text materials to supplement the new computer literacy programs which are appearing in secondary schools across the country. *Kids And The Apple*, prepared by Michigan State University professor Edward H. Carlson fills in a big gap in text materials by offering a tutorial for a specific piece of hardware, the Apple II.

The Apple II isn't the only personal computer in the junior and senior high schools. You'll find Pets, Ataris, and TRS-80, but the Apple II is undeniably a popular choice. Given the clear, clean, logical, and accessible presentation of beginning programming in *Kids*, the Apple II may become even more popular, as courses are planned around an Apple II/*Kids And The Apple* "system."

The introduction to teachers states that *Kids* was written for students at the seventh grade level. In fact, the book is written with such clarity that an advanced fifth grader should have no unresolvable difficulties. The wide range of material covered should hold the interest of high school students in the first and second years.

This book is not just a recapitulation of previously published Applesoft tutorials. It looks at the material in a fresh, imaginative way, presenting it in a manner that gives young programmers solid conceptual foundations on which to build skills and provides a fundamental understanding of the logic of computer programming.

The instruction begins from the ground up, teaching the use of the HOME, PRINT, NEW, and RUN commands. The material goes on to teach skills in making the computer print in various ways, making the bell sound, inverting printing, recovering normal printing, and incorporating the appropriate commands in programs.

Every step of the way, concepts are illustrated in programs which the child copies from the book. As the instruction progresses, the child is given the tools to write programs that use string variables, call up subroutines, "glue" strings on program lines, and use low resolution graphics and even elementary animation techniques. As new concepts are introduced, old ones are reinforced and understanding is enhanced.

As suitable as this book is in a classroom setting, it is not an ideal home tutorial, unless the parent is willing to make a conscious effort to monitor the progress of his child and to actively guide instruction. It may well be worth the trouble; in scanning this book I learned a few things I didn't know and found some concepts from my "adult" Applesoft Tutorial explained so clearly that my own programming skills now reflect an improved understanding.

Adding to the delight of the book are illustrations by Paul D. Trap whose whimsical drawings are frequently very funny and almost always valuable in visually reinforcing a concept in a painless, palatable manner.

Steve Gray, et al.

Kids And The Apple. is just what teachers and parents have been looking for to convert the Apple II from a passive, game-playing diversion into a tool for learning and growing.—*Brian Murphy*

Robotics and Industrial Electronics, Heath Co., Benton Harbor, MI 49022. 1,257 pages, looseleaf in two binders, $99.95. 1982.

Designed to be used with the Heathkit Hero 1 robot ($999.95 kit, $399.95 arm kit, $149.95 voice synthesizer kit; $2499.95 assembled with arm and voice), this course is "fully functional without it," according to the company.

The course, which takes about 120 hours of study, consists of twelve lessons: Robot Fundamentals (robot evolution, terminology, low-technology robots, medium and hi-tech robots), AC and Fluidic Power (AC power, AC motors, hydraulics, pneumatics), DC Power and Positioning (batteries, DC motors, stepper motors), Microprocessor Fundamentals, A Typical Microprocessor Controller (6808 MPU), Data Acquisition (sensors), Data Handling and Conversion, Voice Synthesis, ET-18 Interfacing (ET-18 is the robot's catalog number), Industrial Robots at Work, and Experiments. Four appendixes cover Number Systems and Codes, 6808 Data Sheets, Definition of the Executable Instructions, and The Phoneme Dictionary.

Heath recommends previous completion of their courses in AC and DC electronics, digital techniques, and basic microprocessors, "or a basic knowledge of those subjects," before starting the Robotics Course, which is designed for industrial training as well as individual use. The robot can be assembled in 40 to 60 hours, but Heath doesn't advise novices to try building it.

The text is straightforward, very clear and detailed, with many helpful illustrations. The interfacing chapter gets down to the gate level to describe in detail how the RAM, ROM and control circuits operate. Self-test reviews are provided at the end of each unit within each chapter, plus an optional final exam to be sent to Heath for scoring.

The longest chapter is the last one, 276 pages of experiments, meant to be used with the assembled robot and accompanied by the few necessary additional parts.

This is Heath's most ambitious product yet, and is well worth the money, although the final chapter is of little value without the robot. The course is as complete and detailed as the robot construction manual, written by a company that puts much more effort into its famous, easy-to-follow kit manuals than any other.

PET/CBM Personal Computer Guide, by Adam Osborne and Carroll S. Donahue. Osborne/McGraw-Hill, Berkeley, CA. 509 pages, paperback $15. Second edition, 1980.

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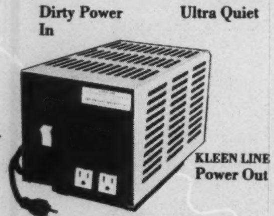

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Book Reviews, continued...

gotten heavily involved with the Osborne 1 computer, his name lives on in this and many other superior publications that have set a standard for computer books.

According to the back cover, this is a "step-by-step guide that assumes no prior knowledge of computers. If you can read English, you can use this book... If you're thinking about buying any personal computer, this book will show you what a PET can do for you. If you've just bought a PET or CBM, this is the book you must have to really understand the computer."

This book tells you just about everything you could possibly want to know about the PET and CBM, with over 500 pages that get into every nook and cranny.

The eight chapters cover an introduction to CBM computers, Operating the CBM, Screen Editing, Programming the CBM, Making the Most of CBM Features, Peripheral Devices, System Information, and CBM Basic. Six appendixes cover character codes, error messages, Basic bibliography (10 of the best books), CBM publications (magazines and newsletters) and reference manuals, number-base conversion tables, and a list of differences between the two sets of ROMs, as they affect the text.

The preface says you can skip everything after the first three chapters if you have no intention of becoming a programmer but only want to run canned programs. Those first three chapters go into fine detail on how to use the computer, with a great many drawings and photographs. The rest of the book is equally detailed, with many examples, short and simple sentences, a layout that makes for very easy reading, and many short programs intended for hands-on use.

As usual with Osborne books, the highpoints are printed in boldface, so an experienced programmer can browse through it quickly and pick up what he needs to know in a short time.

Learning With Computers, by Alfred Bork. Digital Press, Digital Equipment Corp., 12 Crosby Dr., Bedford, MA 01730. 301 pages, hardcover $28. 1981.

"This book focuses on the use of the computer as a learning device... a panoramic view, reflecting many types of usage... based on papers written during the last 10 years, reflecting the work of the Physics Computer Development Project and the Educational Technology Center at The University of California, Irvine," according to the dust jacket.

Each of the seven chapters is each divided into sections and further into topics. "Overview" consists of five short papers providing an overview of computers in education. "Graphics" examines the part played by graphics as an aid to learning. "Educational Technology Center at Irvine" consists of three articles on the work and activity at the Center. "Physics" has six articles on computer dialogs (student interaction with programs). "Classroom" includes five papers on fitting applications into the full class structure. "Authoring Dialogs" has five articles that describe the production of computer-based learning materials. "The Future" sums up with seven papers reviewing future possibilities in areas such as videodiscs, computers versus television, and personal computers in learning.

The book covers a very wide area, and thus almost anyone involved or interested in computers in education can find much of value in these pages. The writing is simple and uncluttered, and there are many illustrations of screen displays. All in all, this is a fine book for a professional who wants details on what's going on in the world of learning with computers (as reflected in the work at one institution), as well as for the amateur who just wants to know something about the field.

Working Robots, by Fred D'Ignazio. Elsevier/Nelson Books, New York. 164 pages, hardcover $11.50. 1982.

The title is somewhat misleading, because this is not a book about how to construct a robot that works, but is rather a low-key look at the world of robots, mostly the industrial and hobbyist types.

After defining what a working robot is, the author goes on to describe various types of robots, briefly discusses the robot brain (a computer, mostly), then looks at languages that teach a robot what to do, robot interfaces to the outside world (speech, vision, mobility, etc.), industrial robots, explorer robots (undersea, outer space), classroom robots (school projects), home robots, building your own (general discussion), robots and the future, and a light discussion of whether robots are servants, friends, or foes. The book ends with a glossary, a list of materials and schools (catalogs, hardware, courses), and a list of books, magazines and articles.

The book seems to have been written for the person who wants to know something about robots, in general, without getting technical. There are no schematics, not even block diagrams, only photographs of the various types of robots discussed. The author writes clearly and informally, and gets into enough detail to be interesting but not so much as to be too technical or boring. Among the robots discussed are Tod Loufbourrow's Mike, the Mars Viking Lander, Hans Moravec's Cart, the Unimate industrial units, and the Terrapin Turtle.

This is a fine book for those whose interest is non-technical, but who want to learn more than just a little about the different kinds of robots and what they can do.

Computer Choices: Beware of Conspicuous Computing!, by H. Dominic Covvey and Neil Harding McAlister. Addison-Wesley Publishing Co., Reading, MA. 236 pages, paperback $8.95. 1982.

According to the front cover, "People are running out and buying computers that improve their image but don't work for them. With this book you will learn to avoid the wastefulness of hi-tech exhibitionism and to choose, develop, and use systems that satisfy real needs." The back cover says this "is not a buying guide, rather it examines the problems and pitfalls of becoming a consumer in the computer age."

The authors have written a fairly standard, basic book on how to buy a useful computer, and improved it with a better title than most such books, as well as inserting a variety of horror stories (which several other authors have also done).

The 14 chapters are about what you'd expect in such a how-to book, but with some snappier titles, such as Introduction: The Enemy is Us, Conspicuous Computing, and Tales of Horror, plus the usual titles such as Software Engineering, Privacy and Security, and Economics of Computing.

Conspicuous computing, used in the catchy subtitle, is described as buying a computer more as a status symbol than as a useful tool. The chapter warns against being misled by ads that dazzle you with all the wonderful things a computer can do for you, and for your image.

The book is interesting as an exercise in trying to turn what can be a boring subject into a more readable and interesting text. However, there are better books, several of which have been reviewed here within the last year, that get right down to the nuts and bolts of selecting a computer for your particular application, with want-lists and all sorts of things to check for.

As a general text, this is good, but for more useful detail, you'll have to go elsewhere. ☐

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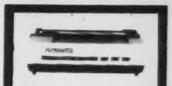

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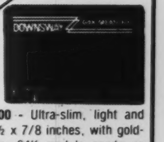

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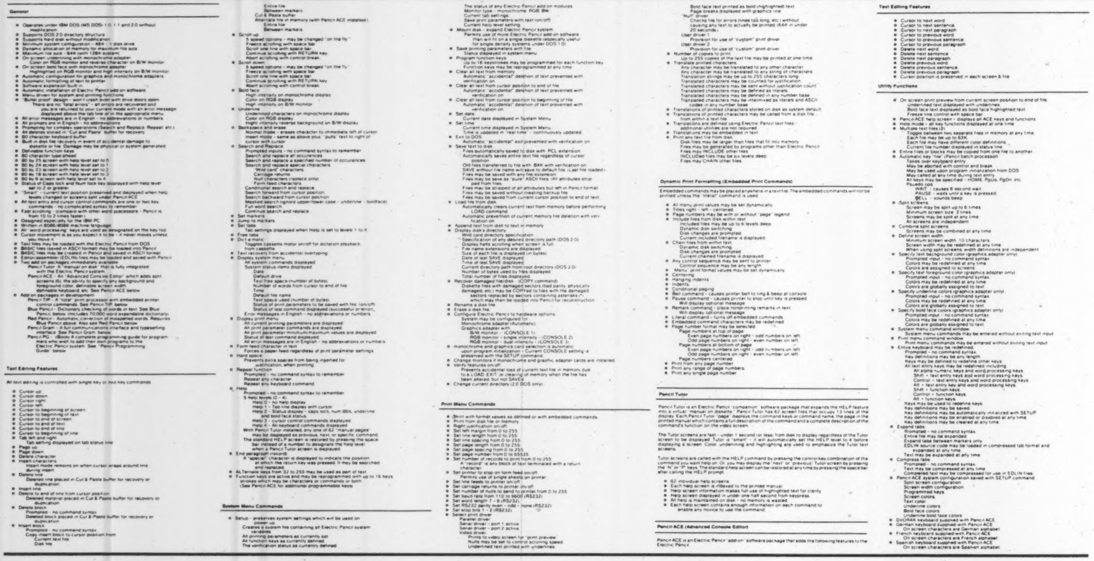

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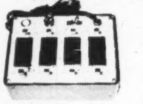

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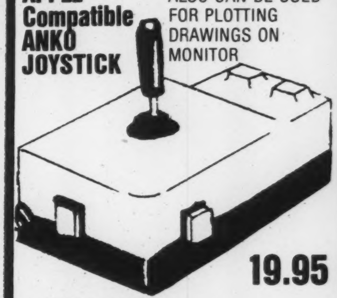

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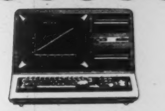

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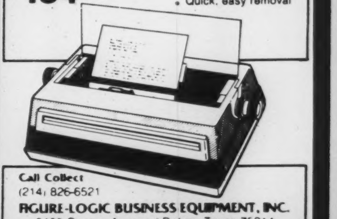

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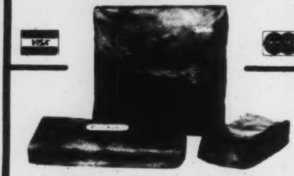

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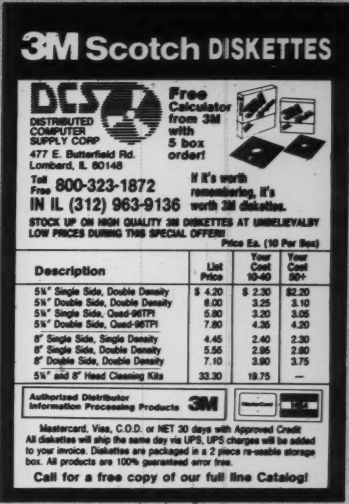

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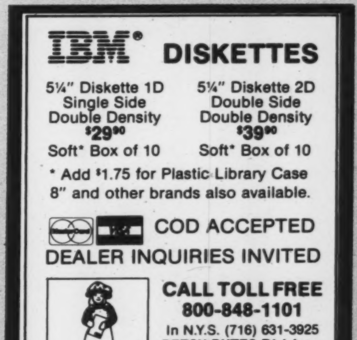

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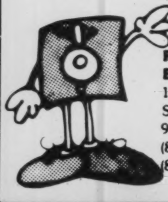

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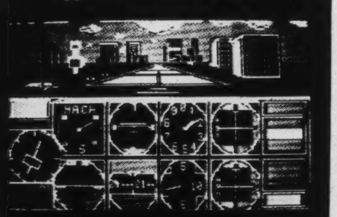

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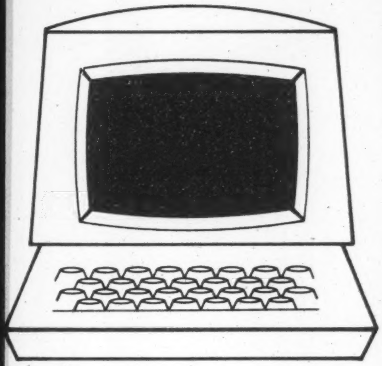

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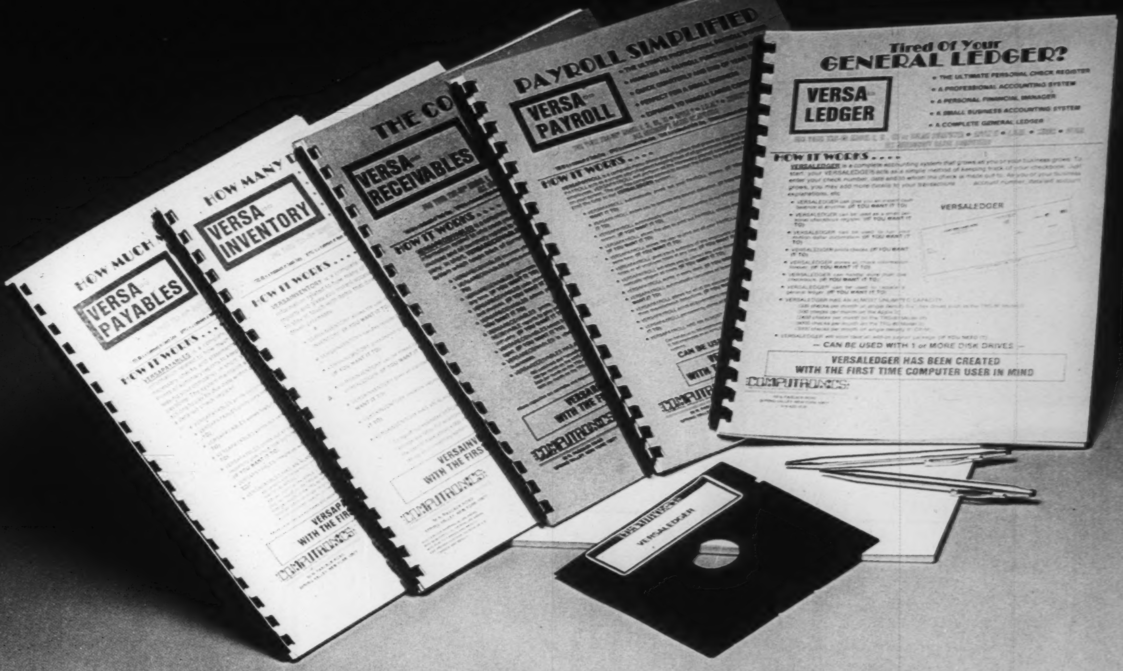

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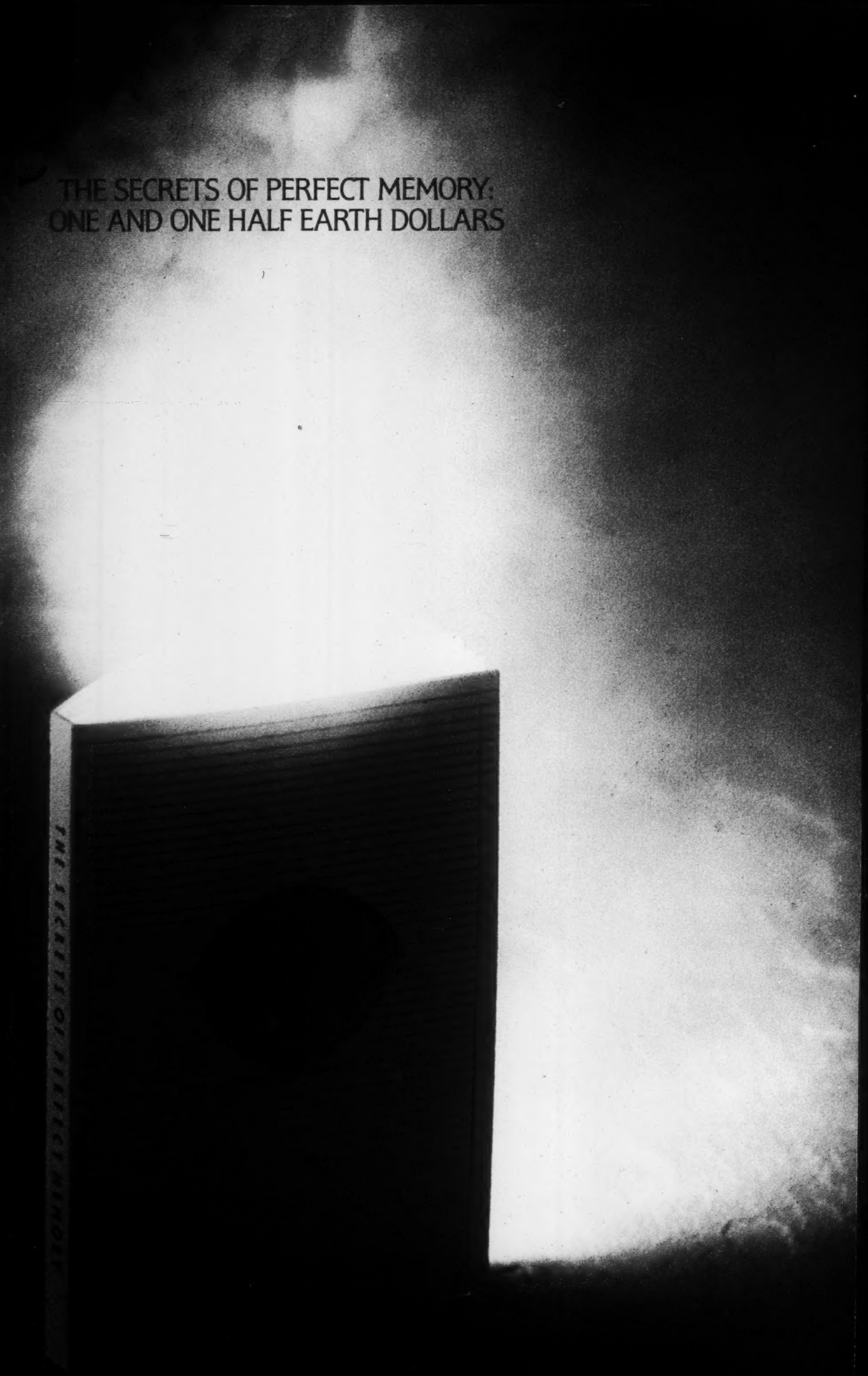

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